IDENTIFICATION AND EVALUATION OF POTENTIAL THIRD PARTY IMPACTS RELATED TO THE HABITAT COMPONENT OF THE PROPOSED PLATTE RIVER RECOVERY

FINAL REPORT

HAZEN AND SAWYER FOR
LAND COMMITTEE
THIRD PARTY SUBCOMMITTEE
U.S. BUREAU OF RECLAMATION

JUNE 13, 2000

An Independent Report
Prepared for the Platte River EIS Office
U.S. Department of the Interior

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June 13, 2000

Hazen and Sawyer for
Land Committee
Third Party Subcommittee
U.S. Bureau of Reclamation

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Identification and Evaluation of Potential Third Party Impacts Related to the Habitat Component of the Proposed Platte River Recovery Implementation Plant
Final Report

Dear Mr. Brown:

Hazen and Sawyer is pleased to submit one bound, one unbound and an electronic copy of the Third Party Impact Study Final Report. Hazen and Sawyer has integrated the comments received on both the Draft Report released in November, 1999, and the Final Draft Report released on January 31, 2000, into this document. We consider this report to be an initial investigation into the potential negative and positive impacts of the Program on landowners, businesses, government entities and households in Central Nebraska.

The Hazen and Sawyer project team members responsible for this report were Lisa A. McDonald, Ph.D., Natural Resource Economist, Grace M. Johns, Ph.D., Agricultural and Natural Resource Economist, Chris Meline, Agricultural Economist, and Dave Sayers, Agricultural Economist. We would also like to sincerely thank the individuals who have actively participated in this process, including Vernon Nelson and Rhodell Jameson, Co-Chairs of the Land Committee, Mark Czaplewski of Central Platte Natural Resources District, Brian Barels and Rocky Plettner of Nebraska Public Power District, Jim Lundgren of Nebraska Water Users, Dick Pierce and Roger Bauer, Co-Chairs of the Third Party Impact Subcommittee, Dale Strickland, Executive Director of the Platte River Endangered Species Program, and Dayle Williamson of Nebraska Natural Resources Commission. We would also like to thank Randy Christopherson and Dawn Munger of the U.S. Bureau of Reclamation, and Dr. Ray Supalla and Dr. Charles Lamphear of the University of Nebraska – Lincoln, and numerous others for their review and timely comments on earlier drafts of this report.

We have enjoyed working on this very important assignment and look forward to hearing your comments regarding this report.

Very truly yours,

HAZEN AND SAWYER, P.C.

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Principal Economist
Project Manager

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Executive Summary

The purpose of this Final Report is to provide estimates of the potential third party impacts associated with the *Habitat Component of the First Increment of the proposed Platte River Recovery Implementation Program* (herein referred to as "*Program*"). The goal of the Program is to protect habitat for targeted species in and along the Platte River from Lexington to Chapman, Nebraska while minimizing the expected adverse third party impacts to landowners and residents. The Program will focus on improving and maintaining migration habitat for whooping cranes and reproductive habitat for least terns and piping plovers. It will strive to achieve the habitat goal through acquisition, restoration and management of land and/or land interests along an 89-mile stretch of the Platte River in central Nebraska.

The milestones and exact structure of the Habitat Component have yet to be defined by the Governance Committee (GC) and the Land Committee (LC) and this study is designed to provide input which will minimize or avoid potential negative impacts. Therefore, the results presented in this report ***provide an estimate of the type, characteristics and general extent of potential impacts and not the specific impacts that would occur when the proposed Program is implemented.***

The Scope of Work developed for this study was the result of five scoping meetings facilitated by Hazen and Sawyer and attended by members of the Land Committee, the Third Party Impact Subcommittee, the Governance Committee and the Executive Director of the Platte River Implementation Program. This Final Report follows the guidelines developed in the Phase II Statement of Work dated June 9, 1999. Hazen and Sawyer published a Draft Report titled "Identification and Evaluation of Potential Third Party Impacts Related to the Habitat Component of the Proposed Platte River Recovery Implementation Program", in November, 1999 and extended a comment period to December 31, 1999. Additionally, Hazen and Sawyer released a Final Draft Report on January 31, 2000 and extended a comment period related to this report. The results summarized in this Final Report have considered the comments received on both the Draft and Final Draft Reports.

Third Party Impacts. The impact variables that describe the perceived and hypothesized third party impacts are listed below.

- Changes in current land use to habitat areas
  - *Changes in total income in the study area*
  - *Changes in total sales and employment in the study area*
  - *Changes in crop patterns and value of crop production in the study area*
- Changes in recreation activity
  - *Changes in net recreational opportunities and visitations in the study area*
  - *Changes in total net recreational expenditures in the study area*
  - *Changes in total income in the study area*

- *Changes in total sales and employment in the study area*

- Changes in Habitat Restoration and Management Activities
  - *Changes in total income in the study area*
  - *Changes in total sales and employment in the study area*
- Changes in Fiscal Conditions
  - *Changes in indirect business taxes in the study area*
- Nuisance Factors
- Changes in Water Quality and Quantity
- Changes in Education and Research Opportunities

Study Area. The study area is located in central Nebraska within an area commonly known as the Big Bend Region and includes the counties of Adams, Buffalo, Dawson, Gosper, Hall, Hamilton, Kearney, Merrick, and Phelps. The study area includes 5,633 square miles or 3.6 million acres with total estimated population of 181,237 in 1997. The study area is primarily rural in nature with several urban areas including Grand Island, Kearney, Hastings, and Lexington. The study area's population has increased by about 6 percent over the seven-year period from 1990-1997.

Agriculture is a very important sector for many counties within the study area. For instance, in Hamilton, Kearney, Merrick and Phelps Counties, 20 percent of total county personal income in 1996 was derived from farm operations. Agricultural production includes corn, soybeans, winter wheat, sorghum, hay, beef cattle, milk cows, hogs, pigs, sheep and lambs. Corn is the largest crop in terms of production with 1.8 million acres yielding 257 million bushels. Soybeans were the second largest crop with 219,100 acres yielding 10.4 million bushels. In 1996, about 80 percent of the acreage in crop production was irrigated in the nine county study area. The area was home to 804,000 head of beef cattle; 327,000 head of hogs and pigs; 24,000 head of sheep and lambs; and 3,200 head of milk cows in 1996.

The major sources of personal income in the nine-county study area are (1) Dividends, interest and rent; (2) Transfer payments; (3) Manufacturing; (4) Services; and (5) Government and Government Enterprises. These sources provided 75 percent of total personal income in the study area. Income from farm earnings (excluding "dividends, interest and rent" which is reported separately) comprised 7.3 percent of total personal income in the study area. This is a significant contribution especially considering that this category includes on-farm income only and not income received by supporting industries such as agricultural services, manufacturing, construction, and transportation.

Study Period. The Third Party Impact Study includes an evaluation of impacts from protecting and managing 10,000 acres over a twenty-year study period from 2001 to 2020. This study period was based on some assumptions regarding the schedule for protection, restoration and management of habitat lands. The schedule for habitat protection and management was adapted from the *Preliminary Draft – Milestones for First Increment of Proposed Platte River Recovery Implementation Program,* drafted by the FWS in October 1998. The assumptions made regarding the schedule were developed solely for the purpose of evaluating third party impacts and are as follows.

- The Program will start in 2001 with the restoration and management of the Cottonwood Ranch property (2,650) that was acquired by the Nebraska Public Power District in 1992 for wildlife habitat. Restoration will continue as a phased program and was assumed to be completed by 2006.

- The Program will protect, restore and manage an estimated additional 7,350 acres for endangered species as described for each of the habitat protection scenarios. All 10,000 acres will be restored by 2006.

A twenty-year study period was chosen to capture the full effects of acquiring and/or protecting 10,000 acres during the first increment of Program.

Baseline Condition. The Baseline Condition represents current and expected future land uses on the potential 10,000 acres in the study area without the Program over the study period. The potential 10,000 acres are called the Habitat Protection Area. These land uses include agriculture, recreation, gravel mining and non-Endangered Species Act (ESA) related habitat protection efforts by private and public entities that are likely to occur without the Program. Current conditions are represented as the average land uses and productivity over a certain representative period.

Factors that may affect future land use include changes in farm policies and the demand for second homes and recreation sites along the Platte River. These factors and others were considered when defining the baseline condition. Under the baseline condition, land uses within the Habitat Protection Area will generally mirror current uses over the study period. This conclusion is based on information on land use trends in the nine-county study area. The central Platte region has traditionally been a relatively stable area with agriculture the dominant land use. While there are some indications that land use trends may be changing in the study area with additional development and the purchase of property for second homes, at this time it is not anticipated that the change in land use will be significant. Therefore, it is assumed that current land use conditions will continue over the study period.

Habitat Protection Scenarios. Three habitat protection scenarios were defined for the purpose of evaluating third party impacts as follows.

Scenario 1 – Under this scenario, habitat would be protected in habitat complexes within some of the thirteen central Platte River bridge-to-bridge segments. The Cooperative Agreement indicates that the Program will focus on obtaining and protecting wet meadow and channel habitat within blocks of land, which are suitable for development into habitat complexes. For purposes of this analysis, it is assumed that the Program will focus on the following habitat types.

- main channel habitat – a mixture of wetted channel, sandbars and islands
- riverine buffer – combination of cover types (e.g. main channel habitat, riparian forest and grasslands)
- wet meadows – seasonally wet grasslands
- wet meadow buffers – grasslands and/or croplands

For the purpose of this analysis, the Program will protect and manage 10,000 acres according to the following schedule that was adapted from the FWS's, *Preliminary Draft Milestones for First Increment of Proposed Platte River Recovery Implementation Program,* October, 1998.

- *Cottonwood Ranch Property* would be developed and enhanced for target species starting in 2001 (2,650 acres).
- *Habitat Block A* (3,796 acres) would be developed and enhanced for target species starting in 2004.
- *Habitat Block B* (3,718 acres) would be developed and enhanced for target species starting in 2006.

Scenario 2 – This scenario describes a plan to strategically select habitat areas near or adjacent to existing protected habitat areas. This plan would be used to meet the biological needs of the target species and improve existing management activities on already protected habitat. The distribution of habitat lands under this scenario was based on the location of existing protected areas and identified using the 1998 GIS land coverage database provided by the U.S. Fish & Wildlife Service (FWS). The estimated schedule for protecting and managing these areas is as follows.

- *Cottonwood Ranch Property* would be developed and enhanced for wildlife use starting in 2001 (2,650 acres).
- *Habitat Segment A* would be protected and managed near existing protected areas starting in 2004 (2,613 acres).
- *Habitat Segment B* would be protected and managed near existing protected areas starting in 2006 (2,618 acres).

- *Habitat Segment C* would be protected and managed near existing protected areas starting in 2006 (2,570 acres).

The protection and management of habitat under this scenario, other than the Cottonwood Ranch property, would be based on the perceived needs of the existing protected areas. For instance, it may be determined that existing protected areas need additional acreage managed as buffers to enhance the protection and management of certain habitat areas. Alternatively, existing protected areas may need additional habitat acreage to meet the biological needs of the target species. It is anticipated that the management of habitat under this scenario would be similar to the management under Scenario 1.

Scenario 3 - This scenario describes a situation where the proposed Program would acquire and/or protect habitat lands scattered throughout the Habitat Protection Area. The location of habitat lands would be driven by the cooperation of voluntary participants. The habitat lands under Scenario 3 will be protected and managed according to the schedule proposed for Scenario 1 and Scenario 2. Under Scenario 3, 7,820 acres of habitat would be protected in a series of blocks approximately 500 to 600 acres in size in each of the bridge segment areas. Additionally, Cottonwood Ranch would protect 2,650 acres of habitat under this scenario.

Restoration and Management of Habitat Lands. The third party impact analysis considered how habitat lands would be managed and enhanced under the Program. Management plans have not been developed at this time but it is presumed that an adaptive management approach will be implemented by the management entity. The restoration and management methods used for the purposes of this study were based on information from the FWS and the preliminary results of the study being completed by Western Ecosystems Technology, Inc. titled *Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes.*[1]

The FWS provided acreage summaries of habitat areas that would require restoration and management from the 1998 GIS database of land cover types in the study area. The acreage summaries were used in conjunction with information provided in the Draft Report completed by West, Inc. The study provided results of a survey of land managers in Nebraska who have experience with relevant habitats as well as a literature search of appropriate management techniques. The report was used to estimate the restoration and management technique that may be utilized by the Program to restore each habitat type (e.g. wet meadows). Additionally, the cost per acre for each relevant restoration and management technique was estimated from information provided in this report.

Economic Impacts in the Study Area. Economic impacts of the proposed Program can occur as employment and income of households and businesses are affected by the change in land use on 10,000 acres in the central Platte Region. Economic models were developed and used to

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1 *Western Ecosystems Technology, Inc. "Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000. Cheyenne, Wyoming.*

predict the impacts of potential land use changes on the economy of the study area. A spreadsheet model was developed to evaluate the following potential economic impacts associated with the proposed Program.

- *Agricultural Production* - Changes in total sales, employment and income (direct, indirect and induced) to the study area economy from changing current and future agricultural land uses to protected wildlife habitat.
- *Habitat Restoration and Management* - Changes in sales, employment and income (direct, indirect and induced) to the study area economy from restoring and managing habitat complexes.
- *Recreation* - Changes in total sales, employment and income (direct, indirect and induced) to the study area economy from a potential increase in recreational activities on habitat lands (e.g. hunting, bird watching).

Employment includes the number of full-time and part-time wage and salary jobs in the study area. Income includes wages and salaries, proprietor's income, profit and rent earned in the study area.

The economic impact of the proposed Program can be described in terms of changes in the direct, indirect and induced sales, income, and employment generated in the region due to the change in land use. The direct, indirect and induced economic impacts are captured by the regional economic model and for this study are described as follows.

Direct impacts/sectors - Changes in production by those sectors directly affected by a change in land use can cause changes in sales of these sectors and changes in employment and income to proprietors, property owners, and employees of the sector(s).

Indirect impacts/sectors - Changes in sales, income and employment can occur in other sectors in the study area because these sectors provide goods and services to the direct sector(s).

Induced impacts/sectors - Changes in sales, income and employment can occur in those sectors that provide goods and services to the indirect sector(s) and to the employees of the direct and indirect sectors.

Economic Impact As the Program Affects Agricultural Production

The economic impact of the Program from reduced agricultural production under Scenarios 1, 2 and 3 relative to the baseline condition are presented in Tables ES-1 and ES-2. Under Scenario 1 and Scenario 2, the Program is expected to reduce total (direct, indirect and induced) income in the study area over the twenty-year study period due to reduced agricultural production relative to the baseline condition. The present value of the change in total income over the twenty year period is estimated to be -$774,000 under Scenario 1 and -$995,000 under Scenario 2. Under Scenario 3, total income is expected to be higher than under the baseline condition because

haying and grazing will be used to manage some Program lands by 2011. The present value of the change in total income over the twenty year period is expected be +$75,000.

Under all three scenarios, total (direct, indirect and induced) sales related to agricultural production on Program lands are expected to fall over the study period relative to the baseline condition. The present value of the change in sales over the twenty-year period is estimated to be -$3.9 million under Scenario 1, -$5.5 million under Scenario 2 and -$2.1 million under Scenario 3.

Table ES-1
Economic Impact as the Program Affects Agricultural Production in Study Area Relative to Baseline Condition

	Present Value - 2001 to 2020 at 2.8% Discount Rate		
	Scenario 1	**Scenario 2**	**Scenario 3**
Present Value of the Change in Total Income Relative to the Baseline Condition	-$774,000	-$995,000	$75,000
Present Value of the Change in Total Sales Relative to the Baseline Condition	-$3.9 million	-$5.5 million	-$2.1 million

Note: Total income and total sales represent direct, indirect, and induced effects.

The Program is also expected to change agricultural employment. Under all three scenarios, the number of full-time and part-time jobs is expected to fall during the early part of the study period when acreage is taken out of production and restored as habitat. Under Scenario 1, the loss in jobs is expected to decrease by as much as 7 jobs by 2006. However, by 2011, after Program lands are restored and some areas are managed using grazing and hay production, 2 to 3 fewer jobs will exist in the local economy relative to the baseline condition.

The impact of the Program on agricultural employment is similar under Scenario 2. In this case, the loss in jobs is expected to decrease by as much as 6 jobs by 2006. Again, under this scenario, job losses are estimated to fall between 2 and 3 jobs in the later part of the study period.

Under Scenario 3, about 3 fewer jobs will exist in the study area economy in 2006 as a result of the Program. However, unlike Scenario 1 and 2, employment is expected to increase by as much as 3 jobs during the second half of the study period under Scenario 3.

Table ES-2
Employment Impacts of the Program in the Study Area Due to Reduced Agricultural Production (Relative to Baseline Condition)

	Change in Jobs		
Year	Scenario 1	Scenario 2	Scenario 3
2001	0	0	0
2002	-3	-3	-3
2003	-3	-3	-3
2004	-4	-4	-3
2005	-4	-4	-3
2006	-7	-6	-3
2007	-6	-5	-2
2008	-6	-6	-2
2009	-4	-5	-2
2010	-4	-5	-2
2011	-2	-2	3
2012	-2	-2	3
2013	-2	-2	3
2014	-2	-2	3
2015	-2	-2	3
2016	-2	-2	3
2017	-2	-3	3
2018	-3	-3	3
2019	-3	-3	3
2020	-3	-3	3

Note: Employment impact is the change in the number of full-time and part-time jobs and include direct, indirect, and induced effects.

Economic Impacts as the Program Affects Habitat Restoration and Management

The proposed Program will require restoration and management of habitat complexes along the Platte River. These activities have the potential to provide a positive economic impact to the study area economy by increasing sales, income and employment (direct, indirect and induced). The present value of restoration and management costs over the study period for each Scenario are summarized in Table ES-3 and include $4.96 million under Scenario 1, $3.5 million under Scenario 2 and $6.3 per million under Scenario 3.

Table ES-3
Total Present Value of Restoration and Management Cost (1998s)

	Present Value[1]
Scenario 1	$4,963,000
Scenario 2	$3,494,000
Scenario 3	$6,287,000

1 at 2.8% discount rate.

The estimated changes in income and sales results from restoration and management of habitat lands under each scenario are summarized in Table ES-4. The present value of the change in total income from the restoration of habitat is estimated to be $4.7 million under Scenario 1, $4.0 million under Scenario 2 and $6.1 million under Scenario 3. The present value of the change in sales is estimated to be $7.1 million under Scenario 1, $6.1 million under Scenario 2 and $9.2 million under Scenario 3. Employment is also estimated to increase with the restoration and management of habitat lands. Table ES-5 summarizes the change in employment.

Table ES-4
Economic Impacts as the Program Affects Habitat Restoration and Management
(Relative to Baseline Condition)

	Present Value - 2001 to 2020 at 2.8% Discount Rate		
	Scenario 1	**Scenario 2**	**Scenario 3**
Present Value of the Change in Total Income Relative to the Baseline Condition	$4.7 million	$4.0 million	$6.1 million
Present Value of the Change in Total Sales Relative to the Baseline Condition	$7.1 million	$6.1 million	$9.2 million

Note: Total income and total sales represent direct, indirect, and induced effects.

Employment impacts under Scenario 1 vary each year as indicated in Table ES-5. Employment is estimated to increase by as much as 76 jobs in 2006 when a significant amount of restoration will be under way. Once restoration is complete and the Program is actively managing habitat lands, employment is estimated to be 5 jobs higher each year from 2009 through 2020 than under baseline conditions. Employment is also expected to increase under Scenario 2 as summarized in Table ES-5. Relative to employment under the baseline condition, the number of jobs is expected to increase by 8 jobs in 2001, by 76 jobs in 2006 and 4 jobs each year from 2009 through 2020.

Employment is also estimated to increase with the restoration and management of habitat lands under Scenario 3. Table ES-5 summarizes the change in employment. Employment is estimated to increase by as much as 180 jobs in 2004 when a significant amount of restoration will be under way. Once restoration is complete and the Program is actively managing habitat lands, employment is estimated to be 6 jobs higher each year from 2009 through 2020 than under baseline conditions.

Table ES-5
Employment Impacts as the Program Affects Habitat Restoration and Management (Relative to Baseline Condition)

	Change in Jobs		
Year	**Scenario 1**	**Scenario 2**	**Scenario 3**
2001	8	8	8
2002	13	13	13
2003	9	9	9
2004	71	49	180
2005	32	29	50
2006	76	76	39
2007	15	13	8
2008	14	12	7
2009	5	4	6
2010	5	4	6
2011	5	4	6
2012	5	4	6
2013	5	4	6
2014	5	4	6
2015	5	4	6
2016	5	4	6
2017	5	4	6
2018	5	4	6
2019	5	4	6
2020	5	4	6

Note: Employment impact is the change in the number of full-time and part-time jobs and includes direct, indirect, and induced effects.

Economic Impacts of Increased Recreation

The habitat restoration areas have the potential to provide valuable hunting and bird watching opportunities along the Platte River. Waterfowl hunting and bird watching along the Central Platte River are popular recreation activities. Pheasant, geese and/or duck hunting are allowed at wildlife management areas, private clubs and private lands along the river during their respective seasons. Hunting is one of the most economically valuable land uses along the river because hunters are willing to pay relatively high fees for the privilege.

Because the Central Platte River is an important part of the Central Flyway, the area is teaming with migratory birds during five weeks in the Spring. The study area is known for its large concentrations of sandhill crane during this period. Visitors come to experience the beauty and sounds of over ten million migratory waterfowl including cranes, ducks and geese. In the study area, bird watching tours are offered at the National Audubon Society's Rowe Sanctuary, and at the Crane Meadows Nature Center. The U.S. Fish and Wildlife Service also offers viewing sites. Public viewing areas include the Fort Kearney Hike-Bike Trail and the Central Platte Natural Resource District's viewing platforms located throughout the area.

The Program could potentially increase the number of hunting and bird watching days and recreational expenditures in the study areas under two conditions.

1. **The Program provides public access to some or all of the affected parcels.**

2. **In areas where public access is provided, the Program provides blinds and toilets for hunters and bird watchers.**

Increases in expenditures by recreators will be greatest if public access and certain amenities are provided. Expenditures will increase to a much lower extent if only public access is provided. If neither of these conditions is met, recreation expenditures are not expected to change as a result of land use changes under the Program.

The impacts of the Program, if the above conditions are met, on total income and sales for each scenario are summarized in Table ES-6. These impacts are expected because an increase in recreation-days spent in the study area translates into increased spending in the study area for food, lodging, gasoline, fees and other entertainment. The additional recreational opportunities on Program lands will increase the present value of total income, by $1.3 million, $1.9 million and $ 178,000 under Scenario 1, 2 and 3, respectively. Sales are expected to increase under Scenarios 1, 2 and 3 by $2.8 million, $4.0 million and $381,000, respectively. Sales increases are lower under Scenario 3 than under Scenarios 1 and 2 because recreation opportunities are limited to hunting blinds at Cottonwood Ranch. Employment is also estimated to increase slightly with increased recreation. Table ES-7 summarizes the change in employment from increased recreation.

Table ES-6
Economic Impact as the Program Increases Recreation Opportunities
(Relative to Baseline Condition)

	Present Value - 2001 to 2020 at 2.8% Discount Rate		
	Scenario 1	**Scenario 2**	**Scenario 3**
Present Value of the Change in Total Income Relative to the Baseline Condition	$1.3 million	$1.9 million	$178,000
Present Value of the Change in Total Sales Relative to the Baseline Condition	$2.8 million	$4.0 million	$381,000

Note: Total income and total sales represent direct, indirect, and induced effects.

Employment impacts from increased recreation under Scenario 1 are summarized Table ES-7. Employment is expected to increase by 3 jobs in 2004 and 6 jobs by 2006 when all the facilities are completed. Employment is also expected to increase under Scenario 2 as summarized in Table ES-7. Under this scenario, employment will increase by 3 jobs in 2004 and 9 jobs by

2006 when all the facilities are complete. Employment under Scenario 3 will only increase by 1 job starting in 2004 as summarized in Table ES-7.

Table ES-7
Employment Impacts as the Program Increases Recreation Opportunities (Relative to Baseline Condition)

	Change in Jobs		
Year	Scenario 1	Scenario 2	Scenario 3
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	3	3	1
2005	3	3	1
2006	6	9	1
2007	6	9	1
2008	6	9	1
2009	6	9	1
2010	6	9	1
2011	6	9	1
2012	6	9	1
2013	6	9	1
2014	6	9	1
2015	6	9	1
2016	6	9	1
2017	6	9	1
2018	6	9	1
2019	6	9	1
2020	6	9	1

Note *Employment impact is the change in the number of full-time and part-time jobs and includes direct, indirect, and induced effects.*

Fiscal Impacts. In addition to generating economic activity, private land use is important to the tax base of local government subdivisions. This is especially true in Nebraska because a significant percentage of local tax revenues are generated through property taxes. At this time, the Governance Committee has agreed to pay all property taxes on acquired habitat lands as long as the Program is in place as stated in the following policy statement released on February 9,1999.

> The Program shall pay on an annual basis to the county in which land is acquired in fee title by or on behalf of the Program, the property taxes or an amount equivalent to the property taxes. Such taxes shall be those assessed by the county for similar land classifications. In the case of the property being held in tax-exempt status, the tax equivalent to be paid shall be based upon the then current

assessment for the classification of the land that the property had at the time it was acquired.

Given this policy statement by the Governance Committee, it is not expected that the Program would negatively impact the property tax revenues to local government subdivisions. However, if the Program changed this policy and did not pay taxes on large blocks of program lands that are acquired through fee simple title, there is a potential for negative tax revenue impacts in local areas. This is a significant concern for small, rural school districts that rely heavily on property taxes for funding.

Changes in land use caused by the Program can also potentially impact sales and excise taxes collected by government subdivisions in the central Platte Region. Indirect business taxes include sales and excises taxes that consumers pay to businesses as they purchase goods and services. The change in indirect business taxes was estimated by applying economic multipliers to the change in direct sales resulting from a change in land use. The change in indirect business taxes under Scenario 1, 2 and 3 are summarized in Table ES-8.

Table ES-8
Estimated Changes in Indirect Business Taxes Due to the Program

Present Value of the Change in Business Taxes Due to:	Present Value - 2001 to 2020 at 2.8% Discount Rate		
	Scenario 1	Scenario 2	Scenario 3
Reduced Agriculture Production	-$290,000	-$345,000	-$55,000
Habitat Restoration and Management	$452,000	$382,000	$575,000
Increased Recreation Expenditures in Study Area	$228,000	$323,000	$38,000

The results of this analysis indicate that indirect business taxes would fall with a reduction in agricultural sales from program lands. However, tax receipts are estimated to increase due to sales increases caused by habitat restoration and management activities and increased recreational expenditures.

Impacts to Neighboring Properties. To identify potential impacts of the Program to adjacent property owners, owners of local areas providing habitat protection, their neighbors, and Weed Control District superintendents were interviewed. Interviews were conducted with five habitat owners; five adjacent property owners; and seven Weed District superintendents.

The owners of the habitat-protected properties said that negative impacts to neighboring properties are negligible. All of the five adjacent landowners said that the habitat-protected land adjacent to their property has not caused the following problems.

- Increased trespassing
- Increased mosquito or rodent populations
- Property damage from wildlife
- Unacceptable access to property

Four of the five respondents said that there have been no weed infestations caused by management of the habitat-protected property. One of the respondents said that the tree clearing and ground cultivation on the habitat-protected property has increased the musk thistle population on his property. He has not taken any action to control this infestation but says that he will if the problem gets any worse. Based on information provided by the Weed Control District Superintendents, the cost to treat weed-infested areas during the three to five year control period will vary with the intensity of the infestation. For a severe infestation, an order of magnitude cost would be about $500 per acre during the treatment period.

One of the respondents, a farmer, said that the widening of the river for habitat management has caused flooding on some of his property. As a result, he has had to move his fences.

One respondent indicated that, over the years, there has been an increase in the number of birdwatchers due to the increased crane population. Another farmer indicated that he plans to install fences and no-trespassing signs due to the greater number of bird watchers in recent years. This farmer remarked that "the installation cost of $1,500 for fences, gates and signs was a small price to pay to ensure additional wildlife variety right next door." Overall, neighboring property owners say that the bird watchers are tolerable. However, four of the neighbors interviewed stated that wild game poachers and joy riders are a problem and their numbers would increase proportionally with an increase in the number of birdwatchers.

While adjacent landowners did not indicate that trespassing is a problem on lands located next to currently protected habitat, it is worth noting the policies implemented by habitat managers concerning public access. For all of the private habitat areas in the study area, there is either no public access or it is strictly controlled. As a result, adjacent landowners have not experienced an increase in trespass related problems. If the Program chooses to increase public access to protected habitat areas it is likely that this activity will need to be controlled to avoid problems associated with illegal trespass.

The five neighbors interviewed identified the following positive impacts they received from the habitat-protected property.

- Neighbors enjoy gazing at scenic rangeland
- Aggressive trespasser control of managed property
- Neighbors who are hunters enjoy the additional wildlife
- Potential to receive new fences paid by habitat owner

- Ability of neighbors to observe new cultural practices on the habitat-protected land

Water Quality and Quantity. Under Scenario 1, about 2,497 acres of alfalfa, corn, row crops and pasture would be converted to wildlife habitat. Under Scenario 2, about 2,643 acres of these agricultural lands would be converted to habitat while Scenario 3 would convert 2,033 acres of agriculture production to habitat. Converting land from agricultural production to wildlife habitat has the potential to change the quality of water in the natural watercourse and the quantity of water consumed by the plant life. However, because the amount of acreage to be converted from agricultural production is not significant, positive water quality and quantity impacts are expected to be minor. No detrimental impacts are expected.

Educational and Research Opportunities. The extent and value of educational and research opportunities for habitat-protected areas depends on the management policies of the owners and the degree to which the land can be easily accessed. Some local habitat-protected properties offer access to educational groups, ranging from grade school to graduate school. Some owners encourage research with universities, scouting camps and hunting-mentoring programs. Some owners provide a variety of education programs and look for expansion opportunities; while other owners offer limited programs and seek limited expansion opportunities. Some owners have aggressively pursued visitors while others are passive. There are also concerns of accident liability, which could increase habitat management costs.

Mitigation Strategies. The negative third party impacts associated with the Program that were identified in the Final Draft Report can be summarized as follows.

- Potential negative economic impacts to the agricultural sector in the Central Platte Region due to a land use change from agricultural production to protected wildlife habitat.

- Potential negative impacts to adjacent landowners

Considering these potential negative impacts, Hazen and Sawyer suggests the following mitigation strategies.

- If possible avoid the conversion of high-valued row crop areas such as corn and soybeans to wildlife habitat.

- Maximize the use of agricultural best management practices (BMPs) and local land use practices that are compatible with habitat restoration goals to avoid losses in crop and livestock production.

- Maximize the positive local and regional economic impacts from habitat restoration and management by hiring local contractors to perform restoration and management activities.

- Increase recreational opportunities on potential habitat lands through limited public access.

- Provide necessary resources to properly manage recreational activities during bird watching season (5 weeks in early spring) and hunting season (October through January).

- Conduct operations in a manner consistent with local laws and ordinances that protect adjacent landowners and demonstrate a "good neighbor" attitude towards solving potential problems associated with weed control, fencing and other nuisance factors with adjacent landowners.

1.0 Introduction

1.0 Introduction

The purpose of this Final Report is to present the potential third party impacts associated with the *Habitat Component of the First Increment of the proposed Platte River Recovery Implementation Program* (herein referred to as "*Program*"). The goal of the Program is to protect habitat for targeted species in and along the Platte River from Lexington to Chapman, Nebraska while minimizing the expected adverse third party impacts to landowners and residents. The Program will focus on improving and maintaining migration habitat for whooping cranes and reproductive habitat for least terns and piping plovers. It will strive to achieve the habitat goal through acquisition, restoration and management of land and/or land interests along an 89-mile stretch of the Platte River in central Nebraska.

The milestones and exact structure of the Habitat Component have yet to be defined by the Governance Committee (GC) and the Land Committee (LC) and this study is designed to provide input which will minimize or avoid potential negative impacts. Therefore, the results presented in this report ***provide an estimate of the range of potential impacts and not the specific impacts that would occur when the proposed Program is implemented.***

The Scope of Work developed for this study was the result of five scoping meetings of the Third Party Impact subcommittee facilitated by Hazen and Sawyer and attended by members of the Land Committee, the Third Party Impact Subcommittee, the Governance Committee and the Executive Director of the Platte River Implementation Program. This Final Report follows the guidelines developed in the Phase II Statement of Work dated June 9, 1999.

In addition to this report, Hazen and Sawyer completed a Draft Report in November, 1999 and a Final Draft Report on January 31, 2000. On both reports, Hazen and Sawyer asked for comments from members of the Third Party Impact Subcommittee, the Land Committee, the Governance Committee as well as the general public. The previous reports have also been reviewed by economists at the University of Nebraska in Lincoln and the U.S. Bureau of Reclamation in Denver. The results provided in this Final Report reflect the comments received on the earlier drafts.

1.1 Platte River Recovery Implementation Program

The states of Nebraska, Wyoming, and Colorado, and the U.S. Department of the Interior (DOI) have entered into a partnership (Cooperative Agreement) to address endangered species issues affecting the Platte River Basin. The U.S. Fish and Wildlife Service (FWS) has identified four target species that require protection including: whooping crane, piping plover, interior least tern and the pallid sturgeon. The Cooperative Agreement guides the efforts of the three states and the Federal government and describes the proposed plan to protect targeted species.[1] The

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1 *Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska, signed July 1, 1997, by the Governors of Wyoming, Colorado, and Nebraska, and the Secretary of the Interior.*

Governance Committee (GC) is responsible for implementing the Cooperative Agreement and includes individuals from the three states, DOI, environmental groups and water users.

One goal of the Cooperative Agreement is to protect the habitat of targeted species in and along the Platte River in the Big Bend Region of Nebraska. This habitat goal will be achieved through acquisition, restoration and management of land and/or land interests along a 89 mile stretch of the Platte River between Lexington and Chapman, Nebraska. While the long-term goal is to protect and enhance 29,000 acres, the initial phase (also called "First Increment") of the Platte River Recovery Implementation Program has set a goal of protecting 10,000 acres of suitable habitat over the next thirteen years.

The first 10,000 acres will include the Cottonwood Ranch (2,650 acres) that was previously acquired by the Nebraska Public Power District (NPPD). Additionally, other lands that may be considered part of the initial 10,000 acres include conservation lands owned by the State of Wyoming and conservation easements acquired by the FWS. For the purposes of this study, the acquisition and management of these 10,000 acres will be referred to as the "*Program*".

Habitat protection under the Program will initially focus on enhancing and protecting wet meadow and channel habitat within blocks or segments which are suitable for development into habitat complexes (Cooperative Agreement, Appendix III, Page 7). Habitat protection and management strategies are being developed in the Cooperative Agreement's Habitat Protection Plan. The guidance document recommends that terrestrial and aquatic habitats somewhere within the thirteen bridge segments along the Platte River between Lexington and Chapman, Nebraska be managed for the targeted species.

1.2 Perceived and Hypothesized Impacts

Several perceived and hypothesized third party impacts associated with the proposed Program have been identified as a focus of this study. In identifying potential impacts, the Third Party Impact Subcommittee considered the results of the public meetings in August 1998 by NPPD regarding third party impacts. A key to the evaluation was to define the linkage between potential land use changes caused by the Program and the perceived and hypothesized impacts that have been identified to date.

Hazen and Sawyer, in conjunction with the Third Party Impact Subcommittee, developed a set of impact variables that reflect potential third party impacts of the proposed Program. The impact variables are designed to address perceived and hypothesized economic, fiscal, environmental and social impacts associated with the Program scenarios. The impact variables are dependent on the goals and objectives of the Program as well as the perceived impacts. Changes in impact variables were measured relative to baseline conditions. The impact variables are listed below as they relate to the perceived and hypothesized third party impacts.

- Changes in land use from agriculture to habitat areas
  - *Changes in total income in the study area* – direct, indirect and induced changes including changes in wages, salaries and proprietor's income (farm and non-farm), profits and rent
  - *Changes in total sales and employment in the study area* – direct, indirect and induced changes
  - *Changes in crop patterns and value of crop production in the study area (acres, $)*
- Changes in recreation
  - *Changes in net recreational opportunities and visitations in the study area*
  - *Changes in total net recreational expenditures in the study area*
  - *Changes in total income in the study area – changes in direct, indirect and induced wages and salaries, proprietor's income, profit and rents*
  - *Changes in total sales and employment in the study area*
- Changes in habitat restoration and management activities
  - *Changes in total income – direct, indirect and induced wages and salaries, proprietor's income, profit and rents*
  - *Changes in total sales and employment – direct, indirect and induced*
- Changes in Fiscal Conditions
  - *Changes in Indirect Business Taxes*
- Nuisance Factors
- Changes in water quality and quantity
- Changes in education and research opportunities
- Changes in public expenditures for entitlement programs

2.0 Study Area

2.0 Study Area

The study area is located in central Nebraska within an area commonly known as the Big Bend Region. Figure 2-1 illustrates the study area, which includes the counties of Adams, Buffalo, Dawson, Gosper, Hall, Hamilton, Kearney, Merrick, and Phelps. The study area includes 5,633 square miles or 3.6 million acres (Table 2.1-1) with total estimated population of 181,237 in 1997. Population density is 32.3 persons per square mile. The counties are primarily rural in nature with several urban areas including Grand Island, Kearney, Hastings, and Lexington. The study area's population has increased by about 6 percent over the seven-year period from 1990-1997.

Figure 2-1 Study Area

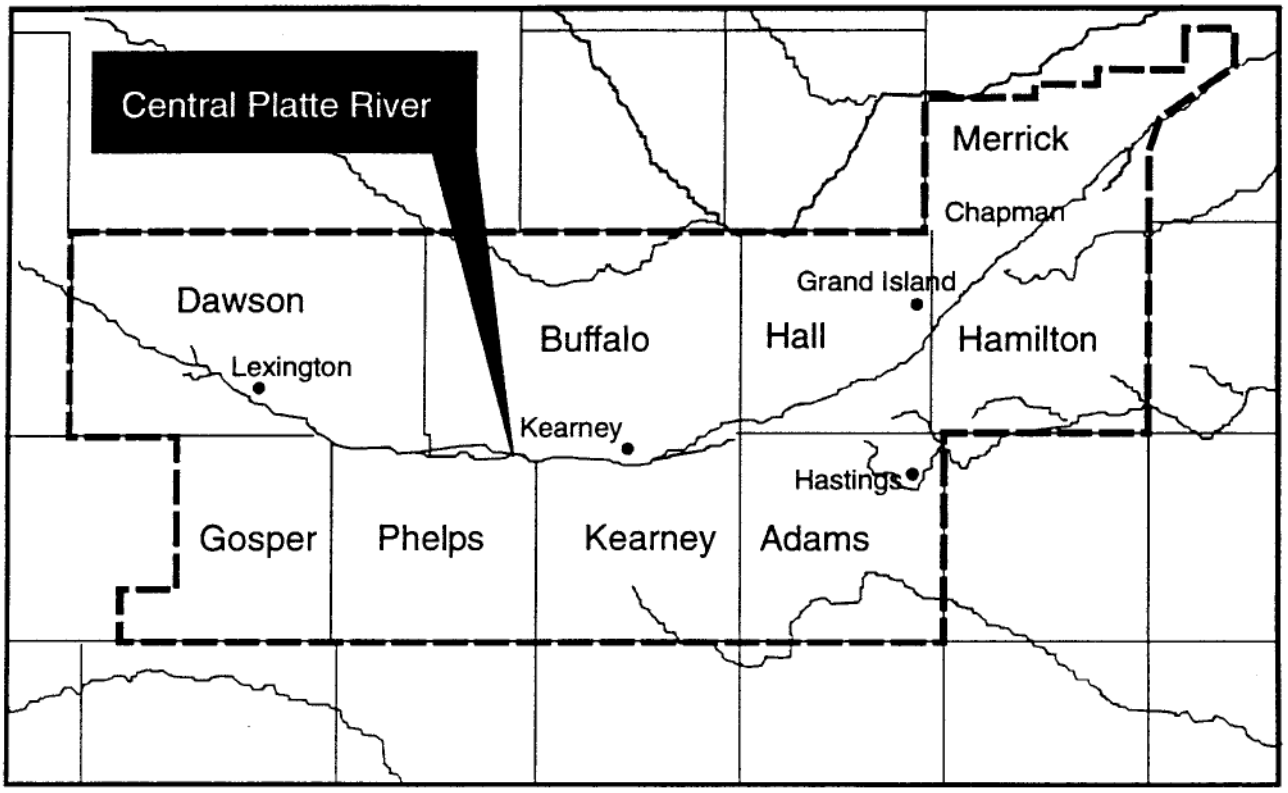

Table 2.1-1
Platte River Study Area Size and Population

County	Acres	1990 Estimated Population	1997 Estimated Population	Percentage Change in Population 1990-1997
Adams	360,320	29,625	29,745	0.41%
Buffalo	619,520	37,447	40,200	7.35%
Dawson	648,320	19,940	23,134	16.02%
Gosper	293,120	1,928	2,288	18.67%
Hall	349,440	48,925	51,675	5.62%
Hamilton	348,160	8,862	9,427	6.38%
Kearney	330,240	6,629	6,679	0.75%
Merrick	310,400	8,049	8,178	1.60%
Phelps	345,600	9,715	9,911	2.02%
Total	3,605,120	171,120	181,237	5.91%

Source: United States Census Bureau, "County Population Estimates for July 1, 1997 and Population Change for April 1, 1990 to July 1, 1997." Website: http://www.census.gov/population/estimates/county/co-99-2/99C2_31.txt. 1999.

Nebraska Department of Development, "The Nebraska Data Book: Land Area of Counties." Website: http://info.neded.org/stathand/asect1.htm. 1999.

The 1996 annual payroll by county and industry for the nine county study area is summarized in Table 2.1-2. Agriculture and government services are not included in this table. Manufacturing and services were the largest of the non-agricultural / non-governmental sectors in Adams, Buffalo, Dawson, Hall, Merrick and Phelps Counties. The largest sectors in Hamilton County were manufacturing and wholesale trade. The largest sectors in Kearney County were services and wholesale trade. Gosper County had a relatively small non-agricultural / non-governmental payroll in 1996 of $2.8 million and it appears that the largest such sectors in this county were finance, insurance, and real estate; services and construction.

Table 2.1-2
1996 Annual Payroll by County and Industry ($1,000s)

Industry	Adams	Buffalo	Dawson	Gosper	Hall	Hamilton	Kearney	Merrick	Phelps	Total
Agricultural Services	*	$2,748	*	*	*	*	$138	$379	$944	$4,209
Mining	*	*	*	$0	*	*	*	$0	*	$0
Construction	$16,851	$17,576	$12,155	$460	$36,321	$1,447	$2,990	$4,455	$5,819	$98,074
Manufacturing	$85,814	$106,820	$88,007	*	$153,146	$19,751	$2,137	$13,948	$26,762	$496,385
Transportation and Public Utilities	$12,066	$13,263	$6,836	$236	$39,234	$4,191	*	$1,726	$4,758	$82,310
Wholesale Trade	$23,466	$27,763	$15,381	$197	$59,242	$10,095	$4,294	$4,142	$9,148	$153,728
Retail Trade	$33,809	$59,208	$20,861	*	$79,417	$4,167	$2,473	$3,164	$6,498	$209,597
Finance, Insurance and Real Estate	$10,434	$14,834	$7,057	$857	$35,584	$2,615	$1,813	$3,282	$4,748	$81,224
Services	$87,003	$107,919	$23,369	$529	$126,892	$8,535	$9,243	$6,960	$17,729	$388,179
Other	*	*	*	*	*	$0	*	$12	*	$12
Total Disclosed	**$269,443**	**$350,131**	**$173,666**	**$2,279**	**$529,836**	**$50,801**				**$1,376,156**
Total Reported	**$270,628**	**$350,434**	**$175,514**	**$2,768**	**$535,525**	**$51,782**	**$23,088**	**$38,068**	**$76,406**	**$1,524,213**

* Withheld to avoid disclosing data for individual companies.

Source: Nebraska Department of Economic Development, "The Nebraska Data Book Employment And Business Establishments By Industry By County." Website: http://info.neded.org/stathand/fsect29.htm. 1999.

Agriculture is a very important sector for many counties within the study area. For instance, in Hamilton, Kearney, Merrick and Phelps Counties, 20 percent of total county personal income in 1996 was derived from farm operations.[1]

Agricultural production, which is important throughout the study area, includes corn, soybeans, winter wheat, sorghum, hay, beef cattle, milk cows, hogs and pigs, and sheep and lambs. Table 2.1-3 summarizes the crop production by acreage and crop type for each county in the study area for 1997. Corn was the largest crop in the region with 1.8 million acres yielding 257 million bushels. Soybeans were the second largest crop with 219,100 acres yielding 10.4 million bushels. Table 2.1-3 also summarizes the number of wells and the amount of acreage irrigated by county. In 1996, about 80 percent of the acreage in crop production was irrigated in the nine county study area.

Table 2.1-3
1997 Crop Production by County

	Total Nine-County Study Area	
Crop	**Acres Harvested in 1997**	**Production (1,000 bushels unless otherwise indicated)**
Corn for Grain	1,772,600	257,529
Soybeans	219,100	10,461
Winter Wheat	68,100	2,470
Grain Sorghum	44,300	3,142
Oats	500	34
All Hay, production in tons	193,500	632
Alfalfa Hay, production in tons	143,900	556
Total	**2,442,000**	**274,824**
Registered Irrigation Wells in 1998, number	12,868	-
Acres Irrigated in 1997	2,034,000	-

Source: U.S. Department of Agriculture, National Agricultural Statistics Service "Crops County Data File." Website: http://www.usda.gov/nass/graphics/county99/indexdata.htm. 1999.

Livestock production in the nine-county area is summarized in Table 2.1-4. The area is home to 804,000 head of beef cattle; 327,000 head of hogs and pigs; 24,000 head of sheep and lambs, and 3,200 head of milk cows.

1 *Estimated from data derived from U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Table CA05, May 1998.*

Table 2.1-4
1992 Livestock Inventory in Nine County Study Area

Livestock Type	Number of Head
Beef Cattle	803,961
Milk Cows	3,169
Hogs and Pigs	327,267
Sheep and Lambs	23,595

Source: U.S. Department of Agriculture, "Compiled from Published Estimates Data Base.- County Level Data" Website: http://www.nass.usda.gov:81

Personal income in the study area by major source and earnings by industry in 1993 and 1997 are presented in Table 2.1-5. Earnings includes wages and salaries, proprietor's income and other labor income. The percentage of total income by source is presented for both years. The distribution of income by source has not changed during this period. The major sources of personal income in the nine-county study area are (1) Dividends, interest and rent; (2) Transfer payments[2]; (3) Manufacturing; (4) Services; and (5) Government and Government Enterprises. These sources provided 75 percent of total personal income in the study area.

Income from farm earnings (excluding "dividends, interest and rent" which is reported separately) comprised 7.3 percent of total personal income in the study area. This is a significant contribution especially considering that this category includes on-farm income only and not income received by supporting industries such as agricultural services, manufacturing, construction, and transportation.

2 *Transfer payments include supplemental security income payments, family assistance, general assistance payments, food stamp payments, and other assistance payments, including emergency assistance.*

Table 2.1-5
Personal Income by Major Source and Earnings by Industry
(thousands of dollars)
Nine County Study Area, Nebraska

Source	1993	Percentage of Total 1993 Income	1997	Percentage of Total 1997 Income
Transfer Payments	495,120	15.3%	615,068	15.7%
Plus - Dividends, Interest and Rent	634,647	19.6%	744,847	19.0%
Plus - Net Labor Income from Outside the County	(55,309)	-1.7%	(71,338)	-1.8%
Less - Personal Contribution for Social Insurance	(153,412)	-4.7%	(194,167)	-5.0%
Earnings by Industry				
Farm Earnings	281,854	8.7%	284,656	7.3%
Agricultural Services, Forestry, Etc.	28,979	0.9%	33,231	0.8%
Mining	5,110	0.2%	7,080	0.2%
Construction				
Special Trade Contractors	55,071	1.7%	88,083	2.2%
Other	46,406	1.4%	65,461	1.7%
Manufacturing	484,095	15.0%	610,384	15.6%
Transportation and Public Utilities	126,392	3.9%	158,103	4.0%
Wholesale Trade	165,982	5.1%	182,501	4.7%
Retail Trade	225,179	7.0%	306,736	7.8%
Finance, Insurance and Real Estate	92,997	2.9%	106,077	2.7%
Services	445,803	13.8%	573,914	14.7%
Government and Government Enterprises	357,093	11.0%	405,765	10.4%
Total	3,236,006	100%	3,916,401	100%

The nine-county study area includes Adams, Buffalo, Dawson, Gosper, Hall, Hamilton, Kearney, Merrick and Phelps.

Transfer payments consist largely of supplemental security income payments, family assistance, general assistance payments, food stamp payments, and other assistance payments, including emergency assistance. Earnings by Industry include wages and salaries, proprietor's income and other labor income.

Source: *Bureau of Economic Analysis, "Regional Accounts Data - Nebraska, 1957 to 1998" Department of Commerce, Washington, D.C., http://www.bea.doc.gov/bea/regional/spi/index.html. (1998 data was incomplete)*

3.0 Definition of Baseline Condition

3.0 Definition of Baseline Condition

Hazen and Sawyer worked with the Third Party Impact Subcommittee, the FWS and others to define habitat protection scenarios that describe the potential land use changes that would result from the proposed Program. The third party impacts for each habitat protection scenario were evaluated relative to a baseline (no program) condition. Therefore, the baseline condition scenario was very important to the analysis.

During the scoping process for the Third Party Impact Study, the committee recognized a certain degree of uncertainty associated with defining the baseline condition especially when considering the level of habitat protection that will take place if the Program is not implemented. Therefore, the committee identified two baseline condition scenarios that were to be considered during this study.

The first Baseline Condition was described as current and future land uses in the study area without the protection of additional habitat over the study period (2001-2020). An alternative baseline was considered where current and future land uses would be modified to include the expected mitigation measures of the FWS if the proposed Program is not implemented. This would involve defining the expected Endangered Species Act (ESA) mitigation measures of the FWS with respect to protecting endangered species and their habitat along the Platte River in the nine county study area. Upon further discussion with the FWS and the U.S. Bureau of Reclamation (BOR), it was determined that the alternative baseline condition can not be clearly defined at this time. Therefore, this analysis considered only one baseline condition.

3.1 Baseline Condition

The Baseline Condition represents current and expected future land uses on the potential 10,000 acres within the study area without the Program over the study period (2001- 2020). These land uses include agriculture, recreation, gravel mining and non-ESA-related habitat protection efforts by private and public entities that are likely to occur without the Program. Current conditions are represented as the average land productivity over a certain representative period.

Current Land Use Conditions. An understanding of the current land use conditions was drawn from two different sources. First, relevant economic data from the nine county study area was reviewed to gain an understanding of the significant industries within the study area. The discussion provided in Section 2.0 highlights the importance of agricultural production.

Land coverage data and GIS maps provided information on existing land uses in the general area along the Platte River where Program lands would be sited. This general area is referred to in this report as "The Habitat Protection Area". This area includes a 3.5 mile-wide track of land on each side of the Platte River from Lexington to Chapman, Nebraska. The area includes approximately one to two miles of floodplain on each side of the river. A buffer area of upland habitat would extend beyond the floodplain.

The Platte River Whooping Crane Maintenance Trust, Inc. developed a GIS database that includes vegetation and land cover types within the Habitat Study Area. The database was developed from aerial photographs taken in September of 1982 and includes 25 surface cover types, including eight riverine types, four agricultural types, ten development type and three other types.[1] The BOR has completed a new digital land cover/land use database for the Habitat Protection Area that updates the 1982 database with data based on aerial photographs taken in August 1998. The new database includes 39 land cover/use types and generally provides additional detail than the 1982 database. Table 3.1-1 provides a summary of the land cover types included in the 1998 GIS database for the Central Platte area that are relevant for this analysis.

Information on land cover types from the 1998 GIS database was used to estimate likely land uses in the Habitat Protection Area under the baseline condition. For each land cover type, potential land uses were estimated with information from the 1998 land cover database[2] and information from interviews conducted with local agricultural extension agents. In general, the major existing land uses within the Habitat Protection Area appear to include crop production, grazing, sand and gravel operations, and dispersed development.

3.2 Future Land Use Conditions

Factors that may affect future land use include changes in farm policies and the potential increase in demand for second homes and recreation sites along the Platte River. These factors and others were considered when defining the baseline condition. It was concluded that land uses within the Habitat Protection Area would remain relatively constant over the study period. This conclusion is based on information on land use trends in the nine-county study area.

3.2.1 Development Trends

The Bureau of Reclamation analyzed the GIS database for changes in commercial and residential development between 1982 and 1998 as represented by each of the land cover databases. A summary is provided in Table 3.1-2. This table summarizes the amount of acreage in commercial and residential development within each bridge segment. For this analysis, the data was taken from the floodplain area only, which is the likely location of Program lands.

Table 3.1-2 shows the amount of acreage in commercial development, residential development with multiple dwellings and residential development with one dwelling each of the twelve bridge segments. The development acreage is summarized for 1982 in the first five rows, for 1998 in the next five rows, and the bottom part of Table 3.1-2 summarizes the difference in development areas between 1998 and 1998. Overall, commercial development acreage within the floodplain has decreased. Residential development with multiple dwellings has increased while residential development with one dwelling has.

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1 *URS Greiner Woodward Clyde Federal Services,* Documentation of Existing Conditions in the Central Platte Valley, Draft Report, *prepared for the U.S. Fish and Wildlife Service and the U.S. Bureau of Reclamation, Denver, Colorado, June 2, 1999.*

2 *Currier, Paul J., Gary R. Lingle, and John G. VanDerwalker,* Migratory Bird Habitat on the Platte and North Platte Rivers in Nebraska, *The Platte River Whooping Crane Critical Habitat Maintenance Trust. Grand Island, Nebraska, 1985.*

Table 3.1-1
Land Use Cover Types and Land Uses under Baseline Condition

Vegetation Code	1998 Vegetation Description[1]	Estimated Land Uses Under Baseline Conditions
Riverine Land Cover Types		
WC	Wetted Channel	Wetted Channel
BB	Beach/Bar	Beach/Bar
HI	Herbaceous on Island	Herbaceous on Island
SI	Shrubs on Island	Shrubs on Island
SH	Shrubs inside Floodplain	Shrubs inside Floodplain
HE	Herbaceous Riparian; also known as "wet meadows"	Grazing
WI	Woody on Island	Woody on Island
Agricultural Land Cover Types		
AL	Alfalfa	Alfalfa
CO	Corn	Corn
OC	Other Crops	Includes winter wheat, sorgum, and fallow fields.
SB	Soybeans	Soybeans
MWM	Mown Field	Movwn Field
GR	Grassland	Grazing
Development surface cover types		
BR	Bridge	Bridge
CD	Commercial Development	Commercial Development
UD	Urban Development	Urban Development
SD	Single Dwelling	Single Dwelling
PL	Powerline	Powerline
GA	Gravel Road	Gravel Road
PR	Paved Road	Paved Road
RR	Railroad	Railroad
PR	Private Road	Private Road
SG	Sand/Gravel Operation	Active or Inactive Sand/Gravel Operation
Other Land Cover Types		
OW	Open Water/Lake/Pit	Open Water/Lake/Pit
WO	Wooded Riparian	Wooded Riparian
WR	Wooded River within Floodplain	Wooded River within Floodplain

1 Land cover types included in the 1998 GIS database for the Central Platte Area. Obtained from the U.S. Bureau of Reclamation.

Table 3.1-1
Comparison of Commercial and Residential Development Acreage in the Central Platte River Floodplain between 1982 and 1998[a]

Development Acreage 1982													
Bridge Segment	1	2	3	4	5	6	7	8	9	10	11	12	**Total**
Commercial	26	68	57	38	9	13	0	44	59	3	0	0	317
Residential (Multiple Dwellings)	235	5	0	0	0	10	0	55	0	0	0	0	305
Residential (1 Dwelling)	116	54	49	53	113	129	80	120	78	9	18	2	821
Total	***377***	***127***	***106***	***91***	***122***	***152***	***80***	***219***	***137***	***12***	***18***	***2***	***1,443***
Development Acreage 1998													
Bridge Segment	1	2	3	4	5	6	7	8	9	10	11	12	**Total**
Commercial	51	25	52	13	15	46	0	38	47	6	1	0	294
Residential (Multiple Dwellings)	187	24	17	5	3	25	40	58	21	0	2	0	382
Residential (1 Dwelling)	67	50	22	19	59	69	76	54	47	11	4	6	484
Total	***305***	***99***	***91***	***37***	***77***	***140***	***116***	***150***	***115***	***17***	***7***	***6***	***1,160***
Difference in Development Acreage (1998-1982)													
Bridge Segment	1	2	3	4	5	6	7	8	9	10	11	12	**Total**
Commercial	25	-43	-5	-25	6	33	0	-6	-12	3	1	0	**-23**
Residential (Multiple Dwellings)	-48	19	17	5	3	15	40	3	21	0	2	0	**77**
Residential (1 Dwelling)	-49	-4	-27	-34	-54	-60	-4	-66	-31	2	-14	4	**-337**
Total	***-72***	***-28***	***-15***	***-54***	***-45***	***-12***	***36***	***-69***	***-22***	***5***	***-11***	***4***	***-283***
Total Acreage in Floodplain	***14,037***	***8,479***	***9,628***	***7,779***	***12,343***	***9,199***	***8,793***	***7,257***	***9,076***	***6,058***	***7,783***	***2,666***	***103,098***

a Data on residential development was obtained from the U.S. Bureau of Reclamation's GIS Land Cover Database on the floodplain region of the Central Platte River between Lexington and Chapman, Nebraska.

Examining the individual bridge segments provides some additional insight. Commercial development acreage has decreased in five out of the twelve bridge segments and increased in the other six areas. Multi-dwelling residential development increased in all the bridge segments except Segment 1. The most significant increase in multi-dwelling development occurred in Segment 7, which realized an increase of 40 acres. For residential development with one dwelling, all bridge segments realized a decrease in acreage except Segment 10 and Segment 12.

It is worth noting that the likely cause of a decrease in acreage for development is due to a difference in interpretation of land covers between the 1982 and 1998 land cover databases. For instance, the interpretation of residential development within the 1982 database tended to include more acreage within each individual residential polygon to account for grass areas. Interpretation of the 1998 land covers tended to be stricter in defining residential and commercial acreage. Therefore, the difference in acreage is likely to be influence by the difference in interpretation.

What is important from this comparison is that development has not significantly increased over the last sixteen years within the floodplain of the study area where Program lands would likely be located. Additionally, of the development that has occurred it accounts for a very small percentage of the total area within the floodplain. Of the 103,100 acres within the study only 524 acres are considered developed or 1%.

Hazen and Sawyer thus concluded that the Program would not likely displace further development opportunities. This is for two reasons. Overall, development has not significantly increased in the floodplain over the last 16 years. Additionally, even though development has increased in some areas the amount of development relative to total acreage in the floodplain is quite small (1%). Therefore, it is not likely that the Program would impact future development Program given the amount of area that could be available for development within each bridge segment and the relatively small area that will be protected for habitat. In other words, individuals wanting to develop a site that has been protected for wildlife could simply develop a substitute site available somewhere within the local area.

The central Platte region has traditionally been a relatively stable area with agriculture the dominant land use. This is supported by the development data provided by the GIS databases. While there are indications that development is increasing in parts of the study area, at this time it is not conclusive that this activity will significantly alter land use. Therefore, it is assumed that current land use conditions will continue over the study period.

3.3 Study Period

The Third Party Impact Study will evaluate the impacts of protecting and managing 10,000 acres over a twenty-year study period from 2001 to 2020. This study period was based on assumptions regarding the schedule for protection, restoration and management of habitat lands. The schedule for habitat protection and management was adapted from the *Preliminary Draft – Milestones for First Increment of Proposed Platte River Recovery Implementation Program,* drafted by the FWS in October 1998. The assumptions made regarding the schedule were developed solely for the purpose of evaluating third party impacts and are as follows.

- The Program will start in 2001 with the restoration and management of the Cottonwood Ranch property that was acquired by the Nebraska Public Power District in 1992 for wildlife habitat. Restoration will continue as a phased program and was assumed to be completed by 2006.

- The Program will protect, restore and manage an estimated additional 7,350 acres for endangered species as described for each of the habitat protection scenarios. All 10,000 acres will be restored by 2006.

A twenty-year study period was chosen to capture the full effects of acquiring and/or protecting 10,000 acres during the first increment of Program.

4.0 Habitat Protection Scenarios

This study evaluated third party impacts associated with three habitat protection scenarios that would describe the Program. The milestones and exact structure of the Program are yet to be defined by the Governance Committee (GC) and the Land Committee (LC) and this study is designed to provide input into the development of these components. Therefore, the committee defined three scenarios designed to capture a full range of potential third party impacts associated with the different protection and management options. The scenarios focus on different habitat needs of the proposed Program but will also address different potential land use changes that may cause third party impacts to the study area.

The three habitat protection scenarios were defined for the purpose of evaluating third party impacts as follows.

4.1 Scenario 1

Under this scenario, habitat would be protected in habitat complexes within some of the thirteen Central Platte River bridge-to-bridge segments. The Cooperative Agreement indicates that the Program will focus on obtaining and protecting wet meadow and channel habitat within blocks of land, which are suitable for development into habitat complexes. For purposes of this analysis, it is assumed that the Program will focus on the following habitat types.

- main channel habitat - a mixture of wetted channel, sandbars and islands
- riverine buffer – combination of cover types (e.g. main channel habitat, riparian forest and grasslands)
- wet meadows - seasonally wet grasslands
- wet meadow buffers – grasslands and/or croplands

For the purpose of this analysis the Program will protect and manage 10,000 acres according to the following schedule that was adapted from the FWS's, *Preliminary Draft Milestones for First Increment of Proposed Platte River Recovery Implementation Program,* October, 1998.

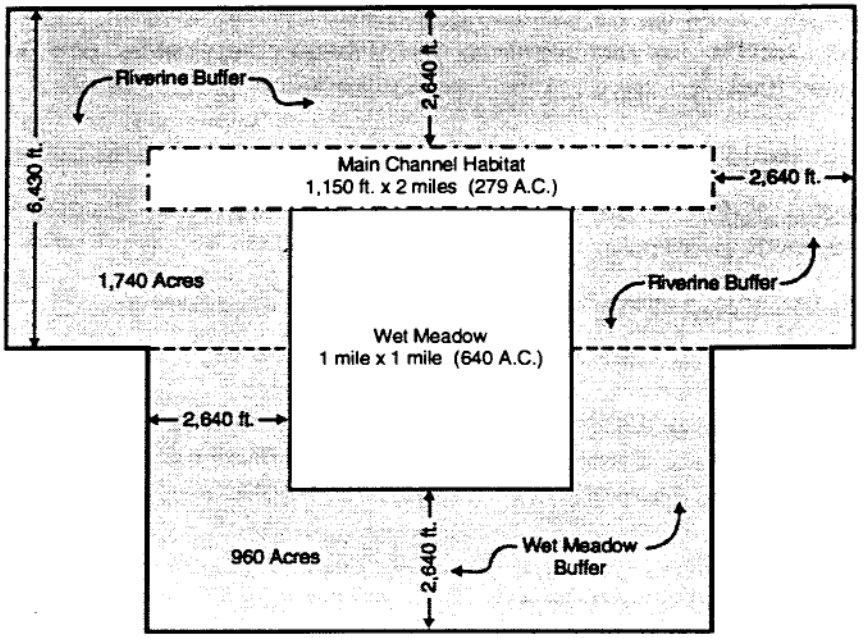
- Cottonwood Ranch property would be developed and enhanced for target species starting in 2001 (2,650 acres).
- Habitat Block A (3,796 acres) would be developed and enhanced for target species starting in 2004.
- Habitat Block B (3,718 acres) would be developed and enhanced for target species starting in 2006.

The Cottonwood Ranch property was acquired by NPPD in 1992 in conjunction with hydropower re-licensing activities before the Federal Energy Regulatory Commission (FERC). A requirement of FERC's license was that NPPD, in consultation with FWS and Nebraska Game and Parks Commission, the GC and the Central Nebraska Public Power and Irrigation District

(CNPP&ID), develop a plan to develop and enhance the Cottonwood Ranch property for wildlife use. The plan was developed in July 1999 and will be implemented by the first year of the Program in 2001.[1] For this scenario, the Cottonwood Ranch property will be the first area protected under the Program.

Under Scenario 1, the Habitat Component will also include the development and protection of two hypothetical habitat blocks that are approximately 3,700 acres in size and depicted in Figure 4-1. The habitat blocks will include a main channel habitat approximately two miles long and 1,150 feet wide or 279 acres; and wet meadow habitat approximately one square mile or 640 acres. These habitat areas would be surrounded by riverine buffer (1,740 acres) and a wet meadow buffer (960 acres). The size and characteristics of these blocks were based on Cooperative Agreement's Habitat Plan.

Figure 4-1 Hypothetical Habitat Complex



[1] *U.S. Fish &Wildlife Service, Preliminary Draft Milestones for First Increment of Proposed Platte River Recovery Implementation Program, October, 1998.*

For the purposes of this study, it was assumed that the habitat blocks would be developed by 2004 and 2006, respectively. The habitat blocks would be located in areas that do not presently have a significant amount of acreage protected for target species. This assumption follows a recommendation made by the FWS.[2] While the location of these areas is not known at this time, potential locations were identified by the FWS using the 1998 GIS land cover database. Habitat Block A will likely be located in the eastern half of the study area while Habitat Block B will be located in the western half. The locations of the habitat blocks were identified for the purposes of determining potential third party impacts only and do not represent the final actions of the Program.

Under this scenario, enhancement of habitat would include the following activities.

- Main channel habitat (280 acres) – Activities will involve (1) clearing vegetation from riverine sandbars, islands and accretion lands; (2) maintaining these areas free from woody vegetation by discing, and mowing. 3) restricting certain human activities and land uses such as residential and commercial development, roads and bridges, and summer recreational activities (picnicking, sunbathing, fireworks displays, driftwood collection and other activities) that may be detrimental to target species utilizing these areas.

- Wet meadows (640 acres) – Existing wet meadows would be acquired and protected or grassland and/or cropland would be converted to wet meadows.

- Riverine Buffers (1,740 acres) – Riverine buffers would be protected to reduce disturbances of target species potentially using the main channel habitat. Therefore, current land uses in buffer areas will not change if it is compatible with habitat protection.

- Wet Meadow Buffers (960 acres) – These buffers would be protected to reduce disturbances of target species potentially using wet meadow habitat. Therefore, current land uses in buffer areas will not change if it is compatible with habitat protection.

4.2 Scenario 2

This scenario describes a plan to strategically select habitat areas near or adjacent to existing protected habitat areas. This plan would be used to meet the biological needs of the target species and improve existing management activities on already protected habitat. The distribution of habitat lands under this scenario was based on the location of existing protected areas and identified using the 1998 GIS land coverage database as provided by FWS. The estimated schedule for protecting and managing these areas is as follows.

2 *U.S. Fish & Wildlife Service, U.S. Fish & Wildlife Service Suggestions for Land/Habitat Acquisition Priorities Along the Central Platte River During the First Increment Of A Future Platte River Recovery Implementation Program, Draft, May 18, 1999, Denver, Colorado.*

- *Cottonwood Ranch Property* (2,650 acres) - would be developed and enhanced for wildlife use starting in 2001.
- *Habitat Segment A* (2,613 acres) - would be protected and managed near existing protected areas starting in 2004.
- *Habitat Segment B* (2,618 acres) - would be protected and managed near existing protected areas starting in 2006.
- *Habitat Segment C* (2,570 acres) - would be protected and managed near existing protected areas starting in 2006.

The protection and management of habitat under this scenario, other than the Cottonwood Ranch property, would be based on the perceived needs of the existing protected areas. For instance, it may be determined that existing protected areas need additional acreage managed as buffers to enhance the protection and management of certain habitat areas. Alternatively, existing protected areas may need additional habitat acreage to meet the biological needs of the target species. It is anticipated that the management of habitat under this scenario would be similar to the management scheme defined under Scenario 1.

4.3 Scenario 3

This scenario describes a situation where the proposed Program would acquire and/or protect habitat lands scattered throughout the Habitat Protection Area. The location of habitat lands would be driven by the cooperation of voluntary participants. Under Scenario 3, 7,820 acres of habitat would be protected in a series of blocks approximately 500 to 600 acres in size in each of the bridge segment areas. Additionally, Cottonwood Ranch would protect 2,650 acres of habitat under this scenario. The habitat lands under Scenario 3 will be protected and restored according to the schedule proposed for Scenario 1 and Scenario 2.

4.4 Restoration and Management of Habitat Lands

The third party impact analysis considered how habitat lands would be managed and enhanced under the Program. Management plans have not been developed at this time but it is presumed that an adaptive management approach will be implemented by the management entity. An adaptive management strategy has been defined in the Cooperative Agreement as follows.[3]

> ... the Governance Committee will monitor and evaluate the impacts of activities implemented in the first increment of the Program on the associated habitats and the response of the target species to those impacts.... Based on the monitoring and evaluation results, additional actions and/or adjustments to existing actions will be identified and implemented, consistent with the purposes of the Program.

3 *Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska, Attachment III, p. 5, July 1, 1997.*

Additionally, information regarding specific restoration and management methods that may be implemented by the Program were provided by the FWS and the preliminary results of the study being completed by Western Ecosystems Technology, Inc. titled *Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes.*[4]

The FWS provided acreage summaries of habitat areas that would require restoration and management from the 1998 GIS database of land cover types is the study area. The acreage summaries were used in conjunction with information provided in the Draft Report completed by West, Inc. The study provided results of a survey of land managers in Nebraska who have experience with relevant habitats as well as a literature search of appropriate management techniques. The report was used to estimate the restoration and management technique that may be utilized by the Program to restore each habitat type (e.g. wet meadows) as well as the cost of each restoration and management activity.

4 *Western Ecosystems Technology, Inc.* Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes, *prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000. Cheyenne, Wyoming.*

5.0 Economic Impact of Land Use Change to Protected Habitat

5.1 Overall Methodology

Economic impacts of the proposed Program occur as employment and income of households and businesses are affected by the change in land use on 10,000 acres in the central Platte Region. Economic models were developed and used to predict the impacts of potential land use changes on the economy of the study area. A spreadsheet model was developed to evaluate the following potential economic impacts associated with the proposed Program.

- *Agricultural Production* - Changes in total sales, employment and income (direct, indirect and induced) to the study area economy from changing current and expected agricultural land uses to protected wildlife habitat
- *Habitat Restoration and Management* - Changes in sales, employment and income (direct, indirect and induced) to the study area economy from restoring and managing habitat complexes
- *Recreation* - Changes in total sales, employment and income (direct, indirect and induced) to the study area economy from a potential increase in recreational activities on habitat lands (e.g. hunting, bird watching)

This section discusses the potential economic impacts of the Program on agriculture. The economic impacts of increased habitat restoration and management and recreation are discussed in Section 6.0 and Section 7.0.

A regional economic model divides the economic system into separate producing sectors. Each sector sells output to final buyers such as consumers, governments and export buyers as well as other sectors. Demands of consumers, governments or export buyers are often termed "final" because the items purchased pass out of the production process. Other sectors may also purchase final goods and services as well as labor, land and capital inputs used in a particular production process.

The economic impact of a sector can be described in terms of changes in the direct, indirect and induced sales, income and employment generated in the region due to the production of that sector. Each sector must produce enough to meet the final demands as well as supply inputs to other sectors. Therefore, changes in production of a primary sector not only affects that sector but also other sectors indirectly. The direct, indirect and induced economic impacts are captured by the regional economic model and for this study are described as follows.

- Changes in production by those sectors directly affected by a land use change can cause changes in direct sales, employment and income to proprietors and employees of the sector(s).

- Changes in indirect sales, income and employment can occur to other sectors in the region not directly associated with a land use change but who provide goods and services to the direct sector(s).

- Changes in induced sales, income and employment can occur to sectors that provide goods and services to indirect sector(s) and to the employees of the direct and indirect sectors.

Using these definitions of direct, indirect and induced economic impacts, the potential economic impacts associated with the Program include the following.

- The estimated changes in total sales, employment and income (direct, indirect and induced) to the study area economy associated with converting land from agricultural production to protected habitat

5.2 Value of Agricultural Production under Current Conditions

Agricultural production is an important part of the regional economy in Central Nebraska. During the project scoping process, concerns were raised that the proposed Program would negatively impact the regional economy if land uses change from agricultural production to managed habitat.

Using information in Section 4.0 on the Habitat Protection Scenarios as a guide, the FWS utilized a GIS land cover database to further describe the land uses in areas where habitat may be protected and restored. The economic contribution of current agriculture production in these areas was estimated and summarized in Tables 5.2-1, 5.2-2, and 5.2-3. This includes all agriculture production in each of the blocks or segments as described from the GIS land cover database. According to these estimates, Scenario 1 provides $1.44 million dollars annually in direct sales due to agriculture production. This results in additional positive economic impacts for the regional economy as summarized in the last four columns of Table 5.2.1. Direct, indirect and induced sales, income and indirect business taxes from agricultural production in the habitat blocks and Cottonwood Ranch are estimated to be $2.1 million, $210,900 and $174,500, respectively. Additionally, 22.2 full-time and part-time jobs are supported by agricultural activities in these areas.

Under Scenario 2, current land activities generate $1.2 million in direct agricultural sales. This further generates direct, indirect and induced sales, income and indirect business taxes totaling $1.7 million, $169,900, $143,700, respectively. Employment supported by agricultural production in these areas is estimated to be 19 jobs.

The economic contribution of current agricultural production on potential habitat lands under Scenario 3 was estimated to generate $728,600 in direct sales. This generates direct, indirect and induced sales, income and indirect business taxes totaling $1.5 million, $104,000 and $88,700, respectively. Agricultural production on these lands also supports 12 jobs.

Table 5.2-2
Estimated Direct, Indirect and Induced Sales, Income, Employment and Indirect Business Taxes from Agriculture Production on Program Lands Prior to Restoration and Management
Scenario 2

Land Use	Acres	Estimated Yield	Price Per Yield	Estimated Direct Sales From Agricultural Production under Current Conditions	Total Direct, Indirect and Induced Sales, Income and Employment generated from Agricultural Production			
					Sales	Income	Employment (No of Jobs)	Indirect Business Taxes
Habitat Segment A								
Wet Meadows (grazing)	36.7	1.3	$20.2	$964	$1,400	$100	0.03	$100
Corn	49.8	175	$3.5	$30,503	$43,900	$4,600	0.43	$3,700
Mown Field (hay)	180.4	3	$63.6	$34,420	$49,900	$3,800	0.96	$4,500
Other Crops (soybeans)	73.7	50	$8.5	$31,323	$45,100	$4,700	0.44	$3,800
Grasslands (grazing)	385	0.6	$20.2	$4,666	$6,800	$500	0.13	$600
Total	***726***			***$101,875***	***$147,100***	***$13,700***	***1.99***	***$12,700***
Habitat Segment B								
Wet Meadows (grazing)	751	1.3	$20.2	$19,700	$28,600	$2,200	0.55	$2,600
Alfalfa	10	4.1	$74.4	$3,100	$4,500	$300	0.09	$400
Corn	177	175	$3.5	$108,400	$156,100	$16,300	1.53	$13,000
Mown Field (hay)	268	3	$63.6	$51,100	$74,100	$5,600	1.42	$6,600
Other Crops (soybeans)	25	50	$8.5	$10,600	$15,300	$1,600	0.15	$1,300
Total	***1,231***			***$192,900***	***$278,600***	***$26,000***	***3.74***	***$23,900***
Habitat Segment C								
Wet Meadows (grazing)	72.1	1.3	$20.2	$1,900	$2,800	$200	0.05	$200
Alfalfa	17.5	4.1	$74.4	$5,300	$7,700	$600	0.15	$700
Corn	766	175	$3.5	$469,200	$675,600	$70,400	6.62	$56,300
Mown Field (hay)	61.4	3	$63.6	$11,700	$17,000	$1,300	0.33	$1,500
Other Crops (soybeans)	119.5	50	$8.5	$50,800	$73,200	$7,600	0.72	$6,100
Total	***1,037***			***$538,900***	***$776,300***	***$80,100***	***7.86***	***$64,800***
Cottonwood Ranch								
Upland Grasses (grazing)	94	0.6	$20.2	$1,100	$1,600	$100	0.03	$100
Wet Meadows (grazing)	518	3	$20.2	$31,400	$45,500	$3,500	0.87	$4,100
Alfalfa	66	4.1	$74.4	$20,100	$29,100	$2,200	0.56	$2,600
Corn	303	175	$3.5	$185,600	$267,300	$27,800	2.62	$22,300
Other Crops (soybeans)	44	50	$50.0	$110,000	$158,400	$16,500	1.55	$13,200
Total	***1,025***			***$348,200***	***$501,900***	***$50,100***	***5.63***	***$42,300***
Total Scenario 2	**4,019**			***$1,181,875***	***$1,703,900***	***$169,900***	***19***	***$143,700***

Table 5.2-1
Estimated Direct, Indirect and Induced Sales, Income, Employment and Indirect Business Taxes from Agriculture Production on Program Lands Prior to Restoration and Management
Scenario 1

Land Use	Acres	Estimated Yield	Price Per Yield	Estimated Direct Sales From Agricultural Production on Program Lands Prior to Restoration	Total Direct, Indirect and Induced Sales, Income and Employment generated from Agricultural Production on Program Lands Prior to Habitat Restoration			
					Sales	Income	Employment (No. of Jobs)	Indirect Business Taxes
Habitat Block A								
Wet Meadows (grazing)	29	1.3	$20.2	$800	$1,200	$100	0.02	$100
Alfalfa	5.3	4.1	$74.4	$1,600	$2,300	$200	0.04	$200
Corn	448	175	$3.5	$274,400	$395,100	$41,200	3.87	$32,900
Other Crops (soybeans)	84.4	50	$8.5	$35,900	$51,700	$5,400	0.51	$4,300
Upland Grasses (grazing)	97.9	0.6	$20.2	$1,200	$1,700	$100	0.03	$200
Mown Field (hay)	274.1	3	$63.6	$52,300	$75,800	$5,800	1.46	$6,800
Total	***939***			***$366,200***	***$527,800***	***$52,800***	***5.93***	***$44,500***
Habitat Block B								
Wet Meadows (grazing)	94.4	1.3	$20.2	$2,500	$3,600	$300	0.07	$300
Alfalfa	57	4.1	$74.4	$17,400	$25,200	$1,900	0.48	$2,300
Corn	1090	175	$3.5	$667,600	$961,300	$100,100	9.41	$80,100
Mown Field (hay)	46.8	3	$63.6	$8,900	$12,900	$1,000	0.25	$1,200
Upland Grasses (grazing)	65.6	0.6	$20.2	$800	$1,200	$100	0.02	$100
Other Crops (soybeans)	72.6	50	$8.5	$30,900	$44,500	$4,600	0.44	$3,700
Total	***1,426***			***$728,100***	***$1,048,700***	***$108,000***	***10.67***	***$87,700***
Cottonwood Ranch								
Upland Grasses (grazing)	94	0.6	$20.2	$1,100	$1,600	$100	0.03	$100
Wet Meadows (grazing)	518	3	$20.2	$31,400	$45,500	$3,500	0.87	$4,100
Alfalfa	66	4.1	$74.4	$20,100	$29,100	$2,200	0.56	$2,600
Corn	303	175	$3.5	$185,600	$267,300	$27,800	2.62	$22,300
Other Crops (soybeans)	44	50	$50.0	$110,000	$158,400	$16,500	1.55	$13,200
Total	***1,025***			***$348,200***	***$501,900***	***$50,100***	***5.63***	***$42,300***
Total Scenario 1	**3,390**			***$1,442,500***	***$2,078,400***	***$210,900***	***22.2***	***$174,500***

Table 5.2-3
Estimated Direct, Indirect and Induced Sales, Income, Employment and Indirect Business Taxes from Agriculture Production on Program Lands Prior to Restoration and Management
Scenario 3

Land Use	Acres	Estimated Yield	Price Per Yield	Estimated Direct Sales From Agricultural Production Under Current Condition	Total Direct, Indirect and Induced Sales, Income and Employment generated from Agricultural Production			
					Sales	Income	Employment (No. of Jobs)	Indirect Business Taxes
Scatter Blocks								
Wet Meadows (grazing)	1611	1.3	$20.2	$42,300	$61,300	$4,700	1.18	$5,500
Alfalfa	38.21	4.1	$74.4	$11,700	$17,000	$1,300	0.33	$1,500
Corn	469.7	175	$3.5	$287,700	$414,300	$43,200	4.06	$34,500
Mown Field (hay)	115	3	$63.6	$21,900	$31,800	$2,400	0.61	$2,800
Other Crops (soybeans)	34.5	50	$8.5	$14,700	$21,200	$2,200	0.21	$1,800
Grasslands (grazing)	173	0.6	$20.2	$2,100	$3,000	$200	0.06	$300
Total	***2,441***			***$380,400***	***$548,600***	***$54,000***	***6.44***	***$46,400***
Cottonwood Ranch								
Upland Grasses (grazing)	94	0.6	$20.2	$1,100	$1,600	$100	0.03	$100
Wet Meadows (grazing)	518	3	$20.2	$31,400	$45,500	$3,500	0.87	$4,100
Alfalfa	66	4.1	$74.4	$20,100	$29,100	$2,200	0.56	$2,600
Corn	303	175	$3.5	$185,600	$267,300	$27,800	2.62	$22,300
Other Crops (soybeans)	44	50	$50.0	$110,000	$158,400	$16,500	1.55	$13,200
Total	**1,025**			***$348,200***	***$501,900***	***$50,100***	***5.63***	***$42,300***
Total Scenario 3	**3,466**			***$728,600***	***$1,050,500***	***$104,100***	***12.07***	***$88,700***

5.3 Summary of Results

The economic impacts associated with converting land uses from agricultural production to managed habitat under the proposed Program are summarized in Tables 5.3-1 and 5.3-2 for Scenario 1. Table 5.3-1 summarizes the changes in income, sales and indirect business taxes from agricultural production on Program lands relative to baseline income, sales, and taxes each year. The results indicate that total income, sales and indirect business taxes (direct, indirect and induced) derived from agricultural production will be lower over the study period than they would be under the baseline condition. Total income, sales and indirect business taxes are estimated to be -$744,000, -$3.9 million and -$290,000 lower, respectively, in present value terms over the study period than they would have been under the baseline condition. Employment impacts are summarized in Table 5.3-2. Employment (direct, indirect and induced) from agricultural production on Program lands is expected to be slightly lower during the study period. Employment is estimated to be as much as 7.2 jobs lower in 2006 and 2.7 jobs lower in 2020 than it would have been under the baseline condition.

The economic impacts associated with converting land uses from agricultural production to protected habitat for Scenario 2 are summarized in Tables 5.3-3 and 5.3-4. As with Scenario 1, total income, sales and indirect business taxes derived from agricultural production on Program lands are expected to decrease over the study period. The present value of changes in income, sales and indirect business taxes are estimated at -$995,000, -$5.5 million and -$345,000, respectively. Employment is also expected to be lower under this scenario than under the baseline condition. Employment impacts are summarized in Table 5.3-4. Decreases in employment are estimated to be as much as 6.5 jobs in 2006 and taper off to 2.7 by 2020.

The economic impacts of converting agricultural production to habitat under Scenario 3 are summarized under Table 5.3-5 and Table 5.3-6. Under this scenario, total sales, income and indirect business taxes resulting from agriculture production are expected to decrease over the study period. The present value of changes in income, sales and indirect business taxes are estimated at $75,000, -$2.1 million and -$55,000, respectively. Employment impacts are summarized in Table 5.3-6. Under Scenario 3, employment is expected to decrease in the early part of the study period by as much as 3.2 jobs in 2006. However, after 2011 the Program is expected to increase agricultural employment slightly by 3 jobs relative to the baseline condition.

The present value of the changes in income is positive for the following reasons. First, under this scenario, the Program will convert approximately 1,700 acres currently covered with trees and not used for agricultural production into wet meadows and grassland areas. Agricultural sales from the scatter block areas are expected to increase once restoration is complete. This will offset the loss in agricultural sales at Cottonwood Ranch. Towards the later part of the study period, agricultural sales are expected to be positive under this scenario. Therefore, the change in sales, income, and indirect business taxes are either positive or negative, depending on (1) the difference in direct agricultural sales from the scatter blocks and Cottonwood Ranch, (2) the difference in multipliers, and (2) the effect of discounting.

Table 5.3-1
Economic Impact as Program Affects Agricultural Production
Changes in Total Income, Total Sales and Total Indirect Business Taxes Relative to Baseline Condition - Scenario 1

	Change in Total Income - 1998$s				Change in Total Sales - 1998$s				Change in Indirect Business Taxes - 1998$s			
Year	Block A	Block B	Cottonwood Ranch	Total	Block A	Block B	Cottonwood Ranch	Total	Block A	Block B	Cottonwood Ranch	Total
2001	$0	$0	-$1,000	-$1,000	$0	$0	-$5,000	-$5,000	$0	$0	-$400	-$400
2002	$0	$0	-$39,000	-$39,000	$0	$0	-$293,000	-$293,000	$0	$0	-$16,000	-$16,000
2003	$0	$0	-$39,000	-$39,000	$0	$0	-$296,000	-$296,000	$0	$0	-$17,000	-$17,000
2004	-$22,000	$0	-$40,000	-$62,000	-$77,000	$0	-$298,000	-$375,000	-$7,000	$0	-$17,000	-$24,000
2005	-$22,000	$0	-$40,000	-$62,000	-$77,000	$0	-$301,000	-$378,000	-$7,000	$0	-$17,000	-$24,000
2006	-$22,000	-$45,000	-$40,000	-$107,000	-$77,000	-$149,000	-$303,000	-$529,000	-$7,000	-$12,000	-$17,000	-$36,000
2007	-$22,000	-$45,000	-$25,000	-$92,000	-$77,000	-$150,000	-$253,000	-$480,000	-$7,000	-$12,000	-$13,000	-$32,000
2008	-$22,000	-$46,000	-$25,000	-$93,000	-$77,000	-$152,000	-$255,000	-$484,000	-$7,000	-$13,000	-$13,000	-$33,000
2009	$13,000	-$46,000	-$26,000	-$59,000	$45,000	-$153,000	-$258,000	-$366,000	$4,000	-$13,000	-$13,000	-$22,000
2010	$13,000	-$47,000	-$26,000	-$60,000	$45,000	-$154,000	-$260,000	-$369,000	$4,000	-$13,000	-$13,000	-$22,000
2011	$13,000	-$19,000	-$26,000	-$32,000	$45,000	-$58,000	-$263,000	-$276,000	$4,000	-$4,000	-$14,000	-$14,000
2012	$13,000	-$20,000	-$26,000	-$33,000	$45,000	-$59,000	-$265,000	-$279,000	$4,000	-$5,000	-$14,000	-$15,000
2013	$13,000	-$20,000	-$27,000	-$34,000	$45,000	-$60,000	-$268,000	-$283,000	$4,000	-$5,000	-$14,000	-$15,000
2014	$13,000	-$20,000	-$27,000	-$34,000	$45,000	-$61,000	-$270,000	-$286,000	$4,000	-$5,000	-$14,000	-$15,000
2015	$13,000	-$21,000	-$27,000	-$35,000	$45,000	-$63,000	-$273,000	-$291,000	$4,000	-$5,000	-$14,000	-$15,000
2016	$13,000	-$21,000	-$27,000	-$35,000	$45,000	-$64,000	-$275,000	-$294,000	$4,000	-$5,000	-$14,000	-$15,000
2017	$13,000	-$21,000	-$28,000	-$36,000	$45,000	-$65,000	-$278,000	-$298,000	$4,000	-$5,000	-$14,000	-$15,000
2018	$13,000	-$22,000	-$28,000	-$37,000	$45,000	-$66,000	-$280,000	-$301,000	$4,000	-$5,000	-$15,000	-$16,000
2019	$13,000	-$22,000	-$28,000	-$37,000	$45,000	-$68,000	-$283,000	-$306,000	$4,000	-$5,000	-$15,000	-$16,000
2020	$13,000	-$22,000	-$28,000	-$37,000	$45,000	-$69,000	-$285,000	-$309,000	$4,000	-$5,000	-$15,000	-$16,000
Present Value[1]	$12,000	-$319,000	-$436,000	-$744,000	$37,000	-$1,020,000	-$3,940,000	-$4,923,000	$3,000	-$82,000	-$210,000	-$290,000

1 at 2.8% discount rate.
Note: Total income and total sales represent direct, indirect, and induced effects.

Table 5.3-2
Employment Impact as Program Affects Agricultural Production Relative to Baseline Condition - Scenario 1

	Change in Employment - Jobs			
Year	Block A	Block B	Cottonwood Ranch	Total
2001	0.0	0.0	-0.10	-0.1
2002	0.0	0.0	-2.9	-2.9
2003	0.0	0.0	-3.0	-3.0
2004	-1.5	0.0	-3.0	-4.5
2005	-1.5	0.0	-3.0	-4.5
2006	-1.5	-2.7	-3.0	-7.2
2007	-1.5	-2.7	-2.0	-6.2
2008	-1.5	-2.8	-2.1	-6.4
2009	0.9	-2.8	-2.1	-4.0
2010	0.9	-2.8	-2.1	-4.0
2011	0.9	-1.0	-2.1	-2.2
2012	0.9	-1.0	-2.2	-2.3
2013	0.9	-1.0	-2.2	-2.3
2014	0.9	-1.1	-2.2	-2.4
2015	0.9	-1.1	-2.2	-2.4
2016	0.9	-1.1	-2.3	-2.5
2017	0.9	-1.1	-2.3	-2.5
2018	0.9	-1.2	-2.3	-2.6
2019	0.9	-1.2	-2.3	-2.6
2020	0.9	-1.2	-2.4	-2.7

Note: Employment impact is the change in the number of full-time and part-time jobs and includes direct, indirect, and induced effects.

Table 5.3.3
Economic Impact as Program Affects Agricultural Production
Change in Total Income, Total Sales and Total Indirect Business Taxes Relative to Baseline Condition - Scenario 2

	Change in Total Income - 1998$s					Change in Total Sales - 1998$s					Change in Indirect Business Taxes - 1998$s				
Year	Segment A	Segment B	Segment C	Cottonwood Ranch	Total	Segment A	Segment B	Segment C	Cottonwood Ranch	Total	Segment A	Segment B	Segment C	Cottonwood Ranch	Total
2001	$0	$0	$0	-$1,000	-$1,000	$0	$0	$0	-$5,000	-$5,000	$0	$0	$0	-$400	-$400
2002	$0	$0	$0	-$39,000	-$39,000	$0	$0	$0	-$293,000	-$293,000	$0	$0	$0	-$16,000	-$16,000
2003	$0	$0	$0	-$39,000	-$39,000	$0	$0	$0	-$296,000	-$296,000	$0	$0	$0	-$17,000	-$17,000
2004	-$14,000	$0	$0	-$40,000	-$54,000	-$48,000	$0	$0	-$298,000	-$346,000	-$4,000	$0	$0	-$17,000	-$21,000
2005	-$14,000	$0	$0	-$40,000	-$54,000	-$48,000	$0	$0	-$301,000	-$349,000	-$4,000	$0	$0	-$17,000	-$21,000
2006	-$14,000	-$17,000	-$51,000	-$40,000	-$122,000	-$48,000	-$57,000	-$147,000	-$303,000	-$555,000	-$4,000	-$5,000	-$11,000	-$17,000	-$37,000
2007	-$14,000	-$17,000	-$51,000	-$25,000	-$107,000	-$48,000	-$57,000	-$148,000	-$253,000	-$506,000	-$4,000	-$5,000	-$11,000	-$13,000	-$33,000
2008	-$14,000	-$17,000	-$52,000	-$25,000	-$108,000	-$48,000	-$57,000	-$149,000	-$255,000	-$509,000	-$4,000	-$5,000	-$11,000	-$13,000	-$33,000
2009	$1,000	-$17,000	-$52,000	-$26,000	-$94,000	$4,000	-$57,000	-$150,000	-$258,000	-$461,000	$0	-$5,000	-$12,000	-$13,000	-$30,000
2010	$1,000	-$17,000	-$53,000	-$26,000	-$95,000	$4,000	-$57,000	-$152,000	-$260,000	-$465,000	$0	-$5,000	-$12,000	-$13,000	-$30,000
2011	$1,000	$8,000	-$42,000	-$26,000	-$59,000	$4,000	$26,000	-$114,000	-$263,000	-$347,000	$0	$2,000	-$8,000	-$14,000	-$20,000
2012	$1,000	$8,000	-$42,000	-$26,000	-$59,000	$4,000	$26,000	-$115,000	-$265,000	-$350,000	$0	$2,000	-$8,000	-$14,000	-$20,000
2013	$1,000	$8,000	-$42,000	-$27,000	-$60,000	$4,000	$26,000	-$116,000	-$268,000	-$354,000	$0	$2,000	-$8,000	-$14,000	-$20,000
2014	$1,000	$8,000	-$43,000	-$27,000	-$61,000	$4,000	$26,000	-$117,000	-$270,000	-$357,000	$0	$2,000	-$9,000	-$14,000	-$21,000
2015	$1,000	$8,000	-$43,000	-$27,000	-$61,000	$4,000	$26,000	-$118,000	-$273,000	-$361,000	$0	$2,000	-$9,000	-$14,000	-$21,000
2016	$1,000	$8,000	-$44,000	-$27,000	-$62,000	$4,000	$26,000	-$119,000	-$275,000	-$364,000	$0	$2,000	-$9,000	-$14,000	-$21,000
2017	$1,000	$8,000	-$44,000	-$28,000	-$63,000	$4,000	$26,000	-$120,000	-$278,000	-$368,000	$0	$2,000	-$9,000	-$28,000	-$35,000
2018	$1,000	$8,000	-$44,000	-$28,000	-$63,000	$4,000	$26,000	-$121,000	-$280,000	-$371,000	$0	$2,000	-$9,000	-$15,000	-$22,000
2019	$1,000	$8,000	-$45,000	-$28,000	-$64,000	$4,000	$26,000	-$122,000	-$283,000	-$375,000	$0	$2,000	-$9,000	-$15,000	-$22,000
2020	$1,000	$8,000	-$45,000	-$28,000	-$64,000	$4,000	$26,000	-$123,000	-$285,000	-$378,000	$0	$2,000	-$9,000	-$15,000	-$22,000
Present Value[1]	-$51,000	-$16,000	-$491,000	-$436,000	-$995,000	-$171,000	-$59,000	-$1,372,000	-$3,940,000	-$5,541,000	-$17,000	-$7,000	-$102,000	-$219,000	-$345,000

1 at 2.8% discount rate.

Note: Total income and total sales represent direct, indirect, and induced effects.

Table 5.3-4
Employment Impact as Program Affects Agriculture Production Relative to Baseline Condition - Scenario 2

	Change in Employment – Jobs				
Year	Segment A	Segment B	Segment C	Cottonwood Ranch	Total
2001	0.00	0.0	0.0	-0.1	-0.1
2002	0.00	0.0	0.0	-2.9	-2.9
2003	0.00	0.0	0.0	-3.0	-3.0
2004	-0.90	0.0	0.0	-3.0	-3.9
2005	-0.90	0.0	0.0	-3.0	-3.9
2006	-0.90	-1.1	-1.5	-3.0	-6.5
2007	-0.90	-1.1	-1.5	-2.0	-5.5
2008	-0.90	-1.1	-1.5	-2.1	-5.6
2009	0.10	-1.1	-1.5	-2.1	-4.6
2010	0.10	-1.1	-1.6	-2.1	-4.7
2011	0.10	0.5	-0.8	-2.1	-2.3
2012	0.10	0.5	-0.8	-2.2	-2.4
2013	0.10	0.5	-0.8	-2.2	-2.4
2014	0.10	0.5	-0.8	-2.2	-2.4
2015	0.10	0.5	-0.9	-2.2	-2.5
2016	0.10	0.5	-0.9	-2.3	-2.6
2017	0.10	0.5	-0.9	-2.3	-2.6
2018	0.10	0.5	-0.9	-2.3	-2.6
2019	0.10	0.5	-0.9	-2.3	-2.6
2020	0.10	0.5	-0.9	-2.4	-2.7

Note: Employment impact is the change in the number of full-time and part-time jobs and includes direct, indirect, and induced effects.

Table 5.3-5
Economic Impact as Program Affects Agricultural Production
Change in Total Income, Total Sales and Total Indirect Business Taxes Relative to Baseline Condition - Scenario 3

	Change in Total Income - 1998$			Change in Total Sales - 1998$			Change in Indirect Business Taxes - 1998$		
Year	Scatter Blocks	Cottonwood Ranch	Total	Scatter Blocks	Cottonwood Ranch	Total	Scatter Blocks	Cottonwood Ranch	Total
2001	$0	-$1,000	-$1,000	$0	-$5,000	-$5,000	$0	-$400	-$400
2002	$0	-$39,000	-$39,000	$0	-$293,000	-$293,000	$0	-$16,000	-$16,000
2003	$0	-$39,000	-$39,000	$0	-$296,000	-$296,000	$0	-$17,000	-$17,000
2004	$0	-$40,000	-$40,000	$0	-$298,000	-$298,000	$0	-$17,000	-$17,000
2005	$0	-$40,000	-$40,000	$0	-$301,000	-$301,000	$0	-$17,000	-$17,000
2006	-$3,000	-$40,000	-$43,000	-$9,000	-$303,000	-$312,000	-$1,000	-$17,000	-$18,000
2007	-$3,000	-$25,000	-$28,000	-$9,000	-$253,000	-$262,000	-$1,000	-$13,000	-$14,000
2008	-$3,000	-$25,000	-$28,000	-$9,000	-$255,000	-$264,000	-$1,000	-$13,000	-$14,000
2009	-$3,000	-$26,000	-$29,000	-$9,000	-$258,000	-$267,000	-$1,000	-$13,000	-$14,000
2010	-$3,000	-$26,000	-$29,000	-$9,000	-$260,000	-$269,000	-$1,000	-$13,000	-$14,000
2011	$80,000	-$26,000	$54,000	$278,000	-$263,000	$15,000	$25,000	-$14,000	$11,000
2012	$80,000	-$26,000	$54,000	$278,000	-$265,000	$13,000	$25,000	-$14,000	$11,000
2013	$80,000	-$27,000	$53,000	$278,000	-$268,000	$10,000	$25,000	-$14,000	$11,000
2014	$80,000	-$27,000	$53,000	$278,000	-$270,000	$8,000	$24,000	-$14,000	$10,000
2015	$80,000	-$27,000	$53,000	$278,000	-$273,000	$5,000	$24,000	-$14,000	$10,000
2016	$80,000	-$27,000	$53,000	$278,000	-$275,000	$3,000	$24,000	-$14,000	$10,000
2017	$80,000	-$28,000	$52,000	$278,000	-$278,000	$0	$24,000	-$14,000	$10,000
2018	$80,000	-$28,000	$52,000	$278,000	-$280,000	-$2,000	$24,000	-$15,000	$9,000
2019	$80,000	-$28,000	$52,000	$278,000	-$283,000	-$5,000	$24,000	-$15,000	$9,000
2020	$80,000	-$28,000	$52,000	$277,000	-$285,000	-$8,000	$24,000	-$15,000	$9,000
Present Value[1]	$511,000	-$436,000	$75,000	$1,781,000	-$3,940,000	-$2,159,000	$155,000	-$210,000	-$55,000

1 at 2.8% discount rate.
Note: Total income and total sales represent direct, indirect, and induced effects.

Table 5.3-6
Employment Impact as Program Affects Agriculture Production Relative to Baseline Condition - Scenario 3

	Change in Employment – Jobs		
Year	Scatter Blocks	Cottonwood Ranch	Total
2001	0.00	-0.10	-0.10
2002	0.00	-2.90	-2.90
2003	0.00	-3.00	-3.00
2004	0.00	-3.00	-3.00
2005	0.00	-3.00	-3.00
2006	-0.20	-3.00	-3.20
2007	-0.20	-2.00	-2.20
2008	-0.20	-2.10	-2.30
2009	-0.20	-2.10	-2.30
2010	-0.20	-2.10	-2.30
2011	5.30	-2.10	3.20
2012	5.30	-2.20	3.10
2013	5.30	-2.20	3.10
2014	5.30	-2.20	3.10
2015	5.30	-2.20	3.10
2016	5.30	-2.30	3.00
2017	5.30	-2.30	3.00
2018	5.30	-2.30	3.00
2019	5.30	-2.30	3.00
2020	5.30	-2.40	2.90

Note: Employment impact is the change in the number of full-time and part-time jobs and includes direct, indirect, and induced effects.

5.3.1 Payments to Landowners

The results summarized above indicate that under all three scenarios, the Program could cause negative economic impacts to the agricultural community. Negative economic impacts include decreases in total sales, income, indirect business taxes and employment from converting agricultural areas to habitat. However, the analysis of agricultural impacts caused by the Program did not estimate the economic impact of increasing payments to landowners for suitable habitat land. For instance, it is likely that the Program would protect habitat areas by purchasing and/or leasing acreage from private landowners. The analysis did not consider the economic implications of increasing expenditures on the protection of habitat areas due to a lack of information on Program strategies to protect habitat and the value of leases or purchases of suitable habitat. However, it is likely that the expenditure on the protection of habitat lands would have a positive economic impact on the regional economy because at least a percentage of this expenditure will remain in the study area. The impact of landowner payments will be further evaluated by the EIS team.

5.4 Methodology

The economic impacts associated with converting land from agricultural production to protected habitat areas were evaluated using the following steps.

Step 1 Define the current and expected land uses of potential Program lands with and without the Program over the study period (2001-2020).

The land management block, segment, and scatter plans were developed by the FWS using guidance provided in the FWS's Draft Habitat Protection Plan and the Platte River Management Joint Study. These documents focus on land acquisition priorities and habitat management techniques and were used as the basis for each of the land management plans. The plans were created using the U. S. Bureau of Reclamation's 1998 Land Cover Database as a base. ArcView 3.2 software was used to digitize management areas and management scenarios.

These management plans are strictly theoretical and are not intended to represent specific habitat acquisition areas. In the development of the plans, no consideration was given to availability of parcels, acquisition or management costs, or feasibility of management scenarios. The plans are for analysis purposes and intended only to be used for estimating potential management costs and potential land management options.

The FWS provided descriptions of potential areas that would be converted to habitat using information from the 1998 GIS database. For each block or segment within each scenario, the FWS identified the following.

- The type and acreage of each land cover type to be protected and/or restored
- The proposed management of each land cover type

According to this database, habitat protection would require acreage currently in corn, alfalfa, soybeans, hay and grazing production to be converted to managed habitat. Table 5.4-1 summarizes the amount of acreage that would be converted to habitat from agricultural production under Scenario 1 and Scenario 2. Table 5.4-2 summarizes the acreage conversion for Scenario 3. Under Scenario 1, approximately 2,497 total acres of alfalfa, corn, soybeans and grazing and hay production would be converted under the Program to habitat while approximately 2,644 total acres would be converted under Scenario 2. Under Scenario 3, approximately 2,033 acres would be converted from agricultural production to habitat. From these two tables, it is apparent that Scenario 1 and Scenario 2 will convert approximately 500 to 600 more acres of agricultural production to habitat than under Scenario 3. The difference in agricultural acreage converted to habitat will influence the differences in economic impacts associated with each scenario.

While the proposed Program will convert land areas currently in agricultural production to habitat, management plans call for much of the protected habitat to be managed using grazing and/or hay production. These activities will provide positive economic benefits to the regional economy. In all of the habitat blocks and segments, the proposed restoration would require the

clearing of trees and shrubs and restoring natural grasslands or wet meadow areas. It was assumed that these areas are currently not used for any economically productive purposes. Therefore, the habitat protection areas would be increasing the amount of acreage that will be used for grazing and hay production under each scenario.

The analysis considered the potential production and sales from protected habitat using grazing and hay production as a management strategy. The amount of acreage that would be managed using grazing and/or hay production for all scenarios is summarized in Table 5.4-3. Under Scenario 1, approximately 2,740 acres would be managed using grazing or hay production. Under Scenario 2, 2,626 acres would be managed using grazing or hay production and under Scenario 3, approximately 3,001 would be managed in this manner. Table 5.2-9 indicates that Scenario 3 would manage approximately 300 to 400 more acres using grazing and hay production and much of this acreage would be areas that previously did not have agricultural production. The difference in grazing and hay production acreage plays an important role in the difference in economic impacts between the three scenarios. A detailed description of the land use conversions estimated for each of the scenarios is provided in Appendix A.

Table 5.4-1
Agricultural Acreage Converted to Habitat
Lands Impacted by Habitat Management Plan for which Economic Impacts are Anticipated

	Scenario 1					Scenario 2				
Year	Alfalfa	Corn	Soybeans	Grazing/ Hay	Total	Alfalfa	Corn	Soybeans	Grazing/ Hay	Total
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	0.0	233.0	125.0	1655.0a	2,013.0	0.0	233.0	125.0	1655.0[a]	2,013.0
2003	0.0	233.0	125.0	1655.0	2,013.0	0.0	233.0	125.0	1655.0	2,013.0
2004	0.0	233.0	125.0	1958.5	2,316.5	0.0	233.0	125.0	1846.2	2,204.2
2005	0.0	233.0	125.0	1958.5	2,316.5	0.0	233.0	125.0	1846.2	2,204.2
2006	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2007	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2008	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2009	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2010	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2011	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2012	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2013	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2014	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2015	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2016	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2017	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2018	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2019	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7
2020	4.2	336.9	197.6	1958.5	2,497.2	0.0	338.2	191.4	2114.1	2,643.7

a. All acreage used for grazing on Cottonwood Ranch (riparian areas, wet meadows and upland grasses) will be taken out of production in 2001.

Table 5.4-2
Agricultural Acreage Converted to Habitat
Lands Impacted by Habitat Management Plan for which
Economic Impacts are Anticipated

	Scenario 3				
Year	Alfalfa	Corn	Soybeans	Grazing/ Hay	Total
2001	0.0	0.0	0.0	0.0	0.0
2002	0.0	233.0	125.0	1655.0[a]	2,013.0
2003	0.0	233.0	125.0	1655.0	2,013.0
2004	0.0	233.0	125.0	1655.0	2,013.0
2005	0.0	233.0	125.0	1655.0	2,013.0
2006	20.0	233.0	125.0	1655.0	2,033.0
2007	20.0	233.0	125.0	1655.0	2,033.0
2008	20.0	233.0	125.0	1655.0	2,033.0
2009	20.0	233.0	125.0	1655.0	2,033.0
2010	20.0	233.0	125.0	1655.0	2,033.0
2011	20.0	233.0	125.0	1655.0	2,033.0
2012	20.0	233.0	125.0	1655.0	2,033.0
2013	20.0	233.0	125.0	1655.0	2,033.0
2014	20.0	233.0	125.0	1655.0	2,033.0
2015	20.0	233.0	125.0	1655.0	2,033.0
2016	20.0	233.0	125.0	1655.0	2,033.0
2017	20.0	233.0	125.0	1655.0	2,033.0
2018	20.0	233.0	125.0	1655.0	2,033.0
2019	20.0	233.0	125.0	1655.0	2,033.0
2020	20.0	233.0	125.0	1655.0	2,033.0
2021	20.0	233.0	125.0	1655.0	2,033.0

a. All acreage used for grazing on Cottonwood Ranch (riparian areas, wet meadows and upland grasses) will be taken out of production in 2001.

Table 5.4-3
Total Acreage Management Through Grazing and/or Hay Production on Program Lands

Year	Scenario 1	Scenario 2	Scenario 3
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	68	68	68
2007	529	529	529
2008	586	586	586
2009	1,564	1,267	666
2010	1,637	1,340	739
2011	2,740	2,626	3,001
2012	2,740	2,626	3,001
2013	2,740	2,626	3,001
2014	2,740	2,626	3,001
2015	2,740	2,626	3,001
2016	2,740	2,626	3,001
2017	2,740	2,626	3,001
2018	2,740	2,626	3,001
2019	2,740	2,626	3,001
2020	2,740	2,626	3,001

Step 2 Estimate the potential change in production and sales from land uses located on potential habitat acreage.

Under Step 2, the current and future land use estimates from Step 1 were used to estimate the agricultural sales from potential habitat lands with and without the Program. Potential production levels were estimated by multiplying the forecasted yield per acre for each crop type by the amount of acreage expected to be in production with and without the Program. The forecasted yield levels were estimated from trend analyses of historical data on yield levels in the nine-county study area. Historical yield data by county and crop used in the trend analysis was obtained from the National Agricultural Statistical Service. Table 5.4-4 summarizes the predicted yields that were used for each crop type in the analysis. Grazing yields without the Program were assumed to be equal to the average yields in the study area and were estimated using information from the local Natural Resource Conservation Service offices. Yields for grazing used for this analysis are also provided in Table 5.4-4.

Table 5.4-4
Yield Predictions on Land Areas Before Habitat Restoration and Protection

	Predicted Yield Range		
Crop	**Low**	**High**	**Units**
Alfalfa	3.6	3.6	Tons
	4.1	4.5	Tons
Corn	149	182	Bushels
	156	190	Bushels
Soybeans	46.7	58.3	Bushels
	46.6	57	Bushels
Wet Meadows			
Grazing	1.3	1.3	Annual AUMs[a]
Hay Production	3.0	3.0	Tons
Upland Grasses			
Grazing	0.6	0.6	Annual AUMs[a]
Hay Production	1.5	1.5	Tons

a Annual AUMs are the number of Animal Unit Months per acre times the number of grazing months per year.

Grazing and hay production yields on Program land after restoration were estimated using information on the type of management practices and average yields in the study area. It was assumed that grazing and hay production would be used to manage habitat areas restored as wet meadows or natural grassland areas and would be employed on a rotational production schedule. Under this schedule, pastureland would either be hayed or grazed, burned or rested in any given year. Grazing and hay production was assumed to commence on Program lands five years after restoration when natural grasses are established. The expected value of grazing and hay

production yields were then estimated using these assumptions and are summarized in Table 5.4-5. A summary of the how these production rates were estimated are provided in Appendix B.

Table 5.4-5
Yield Predictions on Land Areas after Habitat Restoration and Protection

Crop	Predicted Yield	Units
Wet Meadows – Grazing	0.96	Annual AUMs[a]
Hay Production		
Upland Grasses – Grazing	2.1	Annual AUMs[a]
Hay Production	0.75	Tons

a *Annual AUMs are the number of Animal Unit Months per acre times the number of grazing months per year.*

Prices received by farmers for crops and rented pastureland were forecast using data from the National Agricultural Statistical Service. Prices for crops, in 1998 dollars, were estimated as twenty-year averages and were held constant over the study period. Prices for pastureland rental and hay were estimated as five-year averages and were also held constant over the study period. Price predictions used for the analysis are summarized in Table 5.4-6.

Table 5.4-6
Price Predictions used in Analysis

Crop	Price ($/Unit) 1998$	Units
Alfalfa	$74.4	Tons
Corn	$3.5	Bushels
Soybeans	$8.5	Bushels
AUMs	$20.2	AUMs
Hay	$63.6	Tons

As a result of a comment received on the Final Draft Report, Hazen and Sawyer obtained alternative price forecasts for corn and soybeans from the U.S. Agricultural Department and the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri. These alternative price forecasts are summarized in Table 5.4-7.

Table 5.4-7
Alternative Price Forecasts for Corn and Soybeans

	USDA Forecast[a]		FAPRI Forecast[b]	
Year	Corn Price (Farm)	Soybean Price (Farm)	Corn Price (Farm)	Soybean Price (Farm)
	Dollars per Bushel		Dollars per Bushel	
1999/00	1.80	4.90	2.23	5.22
2000/01	1.85	4.25	2.47	4.66
2001/02	1.95	4.15	2.58	4.92
2002/03	2.20	4.35	2.57	5.39
2003/04	2.30	4.65	2.65	5.45
2004/05	2.40	5.10	2.67	5.63
2005/06	2.45	5.55	2.73	5.66
2006/07	2.60	6.05	2.77	5.84
2007/08	2.75	6.40	2.82	5.93
2008/09	2.85	6.35	2.85	6.10
2009/10	3.10	6.55	2.91	6.21
Ten Year Average	2.39	5.30	2.66	5.55

a. *USDA-World Agricultural Outlook Board (WAOB), "Agricultural Statistics System." Washington, DC. 2000. Website: http://www.usda.gov/agency/oce/waob/waob.htm*

b. *Food and Agricultural Policy Research Institute (FAPRI), University of Missouri, "World Agricultural Outlook 2000", January 2000.*

Comparing Table 5.4-6 with Table 5.4-7 indicates that the ten-year average price estimated from the alternative forecasts is significantly lower for soybeans and corn than the average prices used by Hazen and Sawyer to estimate economic impacts from lost agricultural production. The average corn price from these alternative forecasts is 24 to 32 percent lower than that used to estimate economic impacts. For soybeans, the ten-year average price is 35 to 38 percent lower than that used to estimate economic impacts.

The implications of this observation are as follows. First, if prices are closer to the forecasts published by the USDA and FAPRI then the impacts estimated by Hazen and Sawyer are 25 to 40 percent higher than what would be realized. Second, if prices remain at low levels as forecast by these entities, there is a significant likelihood that the future Farm Bill could be renegotiated to provide additional income support to farmers. This action would likely increase farm income closer to the farm income estimated and used for this analysis. In either case, it is likely that the economic impacts as the program affects agricultural production are considered the upper bound estimates.

Price Support Payments

Historical data used to estimate a twenty-year average considered the prices received by farmers for various crops. These prices did not include any price support payments received by farmers. A reviewer made a comment that by not including price support payments the analysis under

estimates the economic impacts of the Program to agriculture. After further review of the data and the current Farm Bill, Hazen and Sawyer concluded that price support payments should not be included in the analysis because they no longer exist.

Step 3 Capital Expenditures for Machinery and Equipment

The multipliers generated by the IMPLAN Model do not take into account capital expenditures for machinery and equipment. The economic impact of reduced capital expenditures was included in the impact estimates. Annual expenditures for machinery depreciation and interest were taken from the 1996 Nebraska Crop Budget and summarized in Table 5.4-8. The annual expenditure for machinery depreciation and interest was included in the model for corn and soybeans.

Table 5.4-8
Estimates of Annual Cost for Machinery Depreciation and Interest for Corn and Soybeans[a]

	Corn Grain (Pivot Irrigation)	Soybeans (Gravity Irrigation)
Machinery Interest	$24.85	$17.81
Machinery Depreciation	$33.88	$23.85
Total	$58.73	$41.66

[a] *Selley, ed. "Nebraska Crop Budgets 1996", University of Nebraska Cooperative Extension.*

Step 4 Estimate Economic Multipliers using the Minnesota IMPLAN Model.

Regional economic modeling is a systematic method to describe production and consumption sectors within a particular economy through a series of linkages among industries and households. The economic model provides input-output (I-O) multipliers that are used to calculate the total direct, indirect and induced changes in sales, income, employment and indirect business taxes caused by a change in sales of the direct industry, such as agriculture.

Hazen and Sawyer utilized the IMPLAN Model (Impact Analysis for PLANning) to estimate economic multipliers for the study area. The IMPLAN Model was originally developed by the USDA Forest Service in cooperation with the Federal Emergency Management Agency and the USDI Bureau of Land Management to assist the Forest Service in land and resource management planning. The IMPLAN Model used by Hazen and Sawyer was developed by MIG, Inc and includes two major components:

- A national-level technology matrix

- Estimates of sectoral activity for final demand, final payments, industry output and employment for each county in the U.S. along with state and national totals. [1]

A major consideration of regional economic modeling is the characteristics of the functional economic area that is described as a semi-self-sufficient economic unit.[2] This unit includes places where individuals live, work and shop. The goal is to make the functional economic area as small as possible to capture all the important effects. However, care must be taken in evaluating small study areas because there is often a high level of leakage. Leakages can be defined as payments for goods and services outside the defined region. For instance if individuals live in one county and work in another, the functional economic area should include both counties because individuals tend to spend money near their place of work and residence.

The functional economic area for this study was defined as the nine-county study area. Two smaller functional economic areas defined as a "West Region" and "East Region" were investigated. The West Region was to include the counties of Dawson, Buffalo, Gosper, Phelps and Kearney. The East Region would include Merrick, Hamilton, Hall and Adams. However, after estimating the multipliers using the IMPLAN Model, it was determined that the multipliers based on the smaller functional economic areas did not provide any additional information over the use of multipliers representing the nine-county study area due to leakages. Therefore, the multipliers used for this study represent the entire nine-county study area.

The economic multipliers were estimated for the nine county study area using 1995 data. These multipliers were then used to estimate changes in direct, indirect and induced sales, employment, income and taxes from habitat protection and are summarized in Table 5.4-9.

Table 5.4-9
Economic Multipliers used in Analysis of Land Use Change[a]

	Economic Multipliers			
Industry	**Sales[b]**	**Income[b]**	**Employment[c]**	**Indirect Business Taxes[b]**
Feed Grains	1.44	0.15	14.10	0.12
Hay and Pasture	1.45	0.11	27.85	0.13
Farm Equipment and Machinery	1.47	0.64	12.89	0.64
Agricultural, Forestry, Fishery Services[d]	1.54	0.67	54.27	0.10

[a] *Estimated with the IMPLAN Model.*
[b] *Per dollar of direct sales.*
[c] *Number of full-time and part-time jobs per million dollars of direct sales.*
[d] *This category includes services related to soil preparation, crops, animal services except veterinary, farm labor and management services, poultry hatcheries, forestry services and fish hatcheries and preserves.*

1 *Minnesota IMPLAN Group, Inc., IMPLAN Professional, Social Accounting and Impact Analysis Software, 1997, Minneapolis, MN.*

2 *Minnesota IMPLAN Group, Inc., IMPLAN Professional, Social Accounting and Impact Analysis Software, 1997, Minneapolis, MN.*

Step 5 Use estimates of changes in direct sales and the economic multipliers to estimate changes in direct, indirect and induced sales, income and employment due to the Program

Changes in direct, indirect and induced sales, income and employment from the proposed Habitat Component were estimated by applying the economic multipliers estimated under Step 4 to the changes in direct sales estimated in Step 2 and Step 3. The results provide an estimate of the economic impacts at the regional level associated with converting land uses from agricultural to protected habitat for the purpose of increasing habitat for endangered species along the Central Platte River.

The present value of expenditures, sales, income and indirect business taxes was calculated using a real discount rate of 2.8 percent. The real discount rate chosen for this analysis follows the recommendations of the U.S. Office of Management and Budget for cost-effectiveness analysis as described in Circular No. A-94.3

5.5 Other Land Uses

Concerns have been raised that restoring habitat along the Platte River will have negative impacts on other types of land use other than agriculture. This includes such things as sand and gravel operations and future development. This section discusses the potential impacts to sand and gravel operations. Impacts to development were discussed in Section 3.0.

5.5.1 Summary of Perceived Impacts of the Program on Sand and Gravel Operations

Hazen and Sawyer evaluated the impact of the Program on the sand and gravel mining industry, as perceived by customers and suppliers operating within the defined study area. A sample of these two key sectors was taken and attempts were made to contact industry experts to get their opinions on potential impacts of the proposed Program. For this purpose, Hazen and Sawyer designed two survey instruments. One survey instrument was designed for sand and gravel suppliers and the other for senior public works personnel directing county road safety and road construction efforts.

The Program is not expected to have significant negative impacts on sand and gravel operations. This is due two reasons. First, the Program is expected to impact a relatively small area with in the entire study area. The First Increment will impact approximately 10,000 acres of the entire study area of approximately 434,199 acres. Therefore, the Program will impact approximately two percent of the acreage along the river within the study area. In addition, the sand and gravel operations are common in many areas along the Platte River given the abundance of these resources in this area. Therefore, it is likely that even if the Program did impact future sand and gravel operations in one area, operators would be able to find suitable replacement quarries within the local area. To support these conclusions, Hazen and Sawyer conducted a series of interviews with local suppliers and customers in the study area. The focus of these interviews

[3] *U.S. Office of Management and Budget, "Memorandum for Heads of Executive Departments and Establishments: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Circular No. A-94", October 29, 1992. Washington, D.C, updated in January 2000.*

was on what would be the impact if the Program did displace current or future sand and gravel operations. The following provides details on the results of these surveys.

Sand and Gravel customers, represented by local municipalities (counties), would experience various impacts if the Program caused relocation of sand and gravel operations further away from the banks of the Platte River. The variance in impacts would be based on factors such as: (a) proximity to quarries, (b) current and future demand for sand and gravel; (c) existence of long-term fixed price contracts with suppliers; (d) ownership interest in quarries and (e) private versus public trucking facilities available for delivery. Because of the presence of several sand and gravel suppliers in the study area there would be price competition among suppliers. The customers would benefit from such competition. Also, relocation of quarrying operations further inland could benefit some customers that are further away from the river. Therefore, if the Program did cause sand and gravel operations to be located away from the Platte River it is not likely that local municipalities would be negatively impacted and some customers might actually benefit from this situation.

Impacts to suppliers may also be variable based on the circumstances faced by the respective suppliers. Some suppliers might have already established operations away from the river, while others might have operated exclusively along the Platte River banks for extended periods.[4] This could give certain suppliers an advantage. Suppliers who already have locations away from the river would not likely incur any premature relocation costs. Also, suppliers with existing riverbank operations would incur losses on long-term fixed price contracts due to likely increases in delivery costs. Conversely, such suppliers might receive windfall profits from said contracts if by moving away from the river they would reduce the distances required for delivery. However, the Program is not expected to interrupt production at any operating sand and gravel operation along the river. Therefore, the location of future operations away from current locations should not impact long-term contracts.

An important observation from the interviews is that neither suppliers nor customers indicated that the Program is likely to reduce the supply of sand and gravel in the study area. The individuals interviewed indicated that transportation and production costs may increase but would be varied across local areas.

5.5.2 Methodology

The sand and gravel mining industry is heavily specialized within the Platte River Basin. Sand and gravel are used mainly for road construction and winter-traction. Other uses include landscaping, aesthetics, residential/commercial construction, etc.

Because of the level of specialization for the use of mined sand and gravel, one survey instrument was designed to conduct telephone interviews with suppliers. The other survey

[4] *Only two sand and gravel suppliers responded to the telephone survey. A better response rate was not obtained due to their failures to respond to voice mail and verbal messages and the suppliers' hectic schedules during the interviewing period.*

focused on public works superintendents. Sand and gravel suppliers are at the point of production and would be directly impacted by any habitat management practices requiring them to locate their operations further inland from the banks of the Platte River. Public works departments would also be impacted because the annual cost of sand and gravel supplied to them is closely related to the distance to the supplying location.

Survey Instrument – Suppliers. The survey instrument used to interview suppliers had nine (9) questions. The questions addressed pertinent issues such as:

- the current and proposed locations of sand and gravel quarries;
- the life expectancy of river-based and inland quarries;
- which counties they supplied with sand and gravel over the last five (5) years;
- annual average production for the last five years;
- average prices received over last five years; and
- perceived impact of shifting quarries further inland on the price of sand and gravel.

Survey Instrument – Customers. The survey instrument used to interview customers with the highest annual quantities demanded for sand and gravel had seven (7) questions. The issues addressed included:

- origin of current sand and gravel received;
- the estimated life expectancy of their suppliers' quarries;
- future alternative mining sites once current source(s) is(are) exhausted;
- forecasts of their sand and gravel needs over the next twenty (20) years;
- current price paid per unit for sand and gravel (including delivery);
- perceived impact of shifting quarries further inland on the price of sand and gravel; and
- trucking cost per mile.

Survey Respondents

Suppliers. A number of sources were used to identify large suppliers of sand and gravel within the Platte River Basin. These sources included industry referrals, client referrals, and local yellow pages listings obtained from the Internet. A sample of 12 sand and gravel suppliers were selected and contact attempts were made by telephone. Of the sample of twelve suppliers, only two surveys were completed. The reasons for the poor response were suppliers "inability to accommodate Hazen and Sawyer personnel due to their busy schedules" (33 %), and "failure to respond" to repeated voice mail or verbal messages that were left (50%).

Customers. Potential survey respondents for the customer survey were obtained from yellow pages listings obtained from the Internet and from Internet Web Pages of respective counties. A total of nine potential respondents were identified for each of the nine counties that would be directly impacted by any habitat management practices requiring sand and gravel suppliers to locate their operations further inland from the banks of the Platte River. Of the total, all but one respondent was interviewed.

Summary of Responses from Customers

Question 1: From how many locations are you getting sand and gravel right now for road operations?

The responses proved that three of the municipalities were receiving their sand and gravel from a sole source. Five respondents receive their sand and gravel from two or more sources. Two respondents receive sand and gravel from as many as five sources.

This means that there should be alternative sources of supply of sand and gravel for at least five of the counties, if habitat management practices required sand and gravel suppliers to locate their operations further away from the banks of the Platte River.

Question 2: What is/are the life expectancy of supplying quarries?

The responses were varied based on knowledge of the supplying quarry. The lowest expectancy rate given was 10 years and the highest was fifty (50) years. One respondent "did not know" the life expectancy of the supply. The average life expectancy was approximately 28 years.

This means it would be 28 years on average before existing sand and gravel suppliers would voluntarily relocate to another site.

Question 3: From what location would you obtain future sources of sand and gravel once current source(s) is (are) exhausted?

Three respondents claimed that their suppliers would be mining sand and gravel within the same areas after the current supply was exhausted because they had secured extended leases on neighboring properties, or had made recent purchases of neighboring properties. Five of the respondents indicated that their suppliers would probably need to relocate to new sites once their current supply site(s) was (were) exhausted.

This means that about 50 percent of the respondents consider their supplier locations to be secure beyond the time of exhaustion of the current quarries. Suppliers for the remaining respondents would be obliged to relocate once current sand and gravel supplies are exhausted. In these cases, the Program could cause some suppliers to relocate future quarries way from the river. However, this is not expected to occur during the next several years.

Question 4: Do you have forecasts of sand and gravel needs over the next twenty years? Can you give an estimate?

The least projected demand for sand and gravel was 23,000 cubic yards per year and the highest projection was 100,000 cubic yards per year. Sand and gravel demand quantities are based on three major factors; (a) the severity of winter weather, (b) the need for winter mobility (i.e., a function of the metropolitan status of the area, and (c) the level of population development and expansion that had been anticipated.

The responses indicate that there will be high demand for deliveries of sand and gravel over the next twenty years. Therefore, any habitat management practices requiring sand and gravel suppliers to relocate their operations further inland from the banks of the Platte River could affect delivery costs.

Question 5: How much are you paying per yard of sand and gravel delivered?

Prices varied based on the ownership of the quarries and who owned the delivery vehicles. Counties who had ownership of either mineral rights or delivery vehicles paid much less than other counties. Another factor affecting the price was an established bidding system, which encourage trucking companies to competitively bid for seasonal delivery of sand and gravel.

The lowest cost per yard paid was $0.25, and the highest was $6.18, in 1999 dollars. The average cost per cubic yard for sand and gravel was $2.96. The respondents with the higher delivery rates indicated that their costs would probably increase if sand and gravel deliveries originated from sites away from the river. One supplier commented that relocation of quarries away from the river would probably reduce delivery coats for their operations.

Question 6a: If sand and gravel operations are located in other parts of the county, other than along the Platte River, does this significantly raise the price of sand and gravel for road operations? Please give estimates of how much the price increases as quarries are located further inland from the river?

The respondents did not give specific information on the expected rate of increase, citing several variables, which they could not predict. However, they indicated whether they thought that the prices would be increased, decreased or stay the same should current sites relocate further away from the banks of the Platte River. One respondent provided a figure; stating that cost would probably increase by $50.00 per load[5]. Three of the remaining respondents indicated that they would expect prices to increase based on their circumstances. Four respondents indicated that there would be no price increases for sand and gravel if their current source was relocated away from the river. Two of these four respondents suggested that their prices were governed by long

[5] *A load is usually 8 to 12 cubic yards in volume, reflecting and increase of $4.16 to $6.25 per cubic yard. This respondent indicated that their supplies of sand and gravel originate across the river, so any movement from the banks of the river would be away from their demand locations*

term mining and delivery contracts with quarry owners and therefore would not be affected by a location change in the supply site.

Question 6b: What is your current trucking cost per mile?

Because some of the respondents provided their own delivery of sand and gravel, it was believed necessary to obtain from those, and estimate of their trucking costs. All three such respondents cited that their costs were embedded into their operations and maintenance costs and were not easily isolated. Therefore no trucking costs were made available.

Summary of Responses from Suppliers

Question 1a & 1b. Do you currently operate quarries along the banks of the Platte River? Do you currently operate quarries in-land from the banks of the Platte River?

One respondent had only operated quarries located away from the river and the other operated only riverbed quarries.

Question 2a & 2b. What are the life expectancies of your riverbank quarries? What are the life expectancies of the in-land quarries?

The riverbank quarries were expected to last between one and fifty years and the quarries located away from the river were estimated to last about 30 years. This means that some of the river bank quarries would be voluntarily decommissioned as early as 2000. While no specifics were given some locations could continue mining operations for another half century. The riverbank locations would certainly be affected if habitat management practices required sand and gravel suppliers to locate their operations further away from the banks of the Platte River. The suppliers presently located away from the river would be indifferent to the Program because of their current location.

Question 3. From what location(s) would you obtain future supplies of sand and gravel, once current sources have been exhausted?

One respondent indicated that they have not begun to seek other sites for future operations, while the other respondent indicated that their intention was to continue initiating sites along the riverbank.

This means that the supplier located away from the river would be indifferent to the Program. However, the riverbank supplier would be directly affected by such a policy.

Question 4. What counties have you supplied over the last five years?

One respondent has supplied only Buffalo County. The other has supplied sand and gravel to a minimum of twenty counties over the last five years. Counties supplied within the defined study area include Dawson and Gosper.

Question 5. What was your annual average production for the last five years?

One respondent has supplied about 18,000 cubic yards of sand and gravel to customers over the last five years, while the other has supplied about 750,000 tons. The delivery cost on ¾ million tons of sand and gravel could be significantly increased if sand and gravel suppliers were required to move their operations further away from the banks of the Platte River. This could also have a significant cost impact on the sand and gravel customers.

Question 6. What was the average or range of prices you received over the last five (5) years?

Neither respondent was willing to give a specific response to this question. Each cited that there was tremendous variability resulting from differences in project administration, mileage, production rates, the market for sand and gravel and long term contract agreements.

Question 7. If the sand and gravel operations are located in other parts of the county, other than along the Platte River, does this significantly raise the price of sand and gravel for road operations? Please give estimates of how much the price would increase as quarries are located further inland from the river?

One respondent had no response due to indifference caused by their current location, which is already located away from the river. The other supplier estimated that the delivery cost would increase by about $2.00 per mile, with calculations based on a 12 cubic yard load. This respondent further suggested that the end result would be devastating to the economy; because suppliers would be forced to different areas. The main reason that was cited for the increase in production costs was the need for additional site preparation once mining operations are located further away from the river.

This respondent quoted that topsoil removal costs would increase by about 200 percent. This means that required clearing and grubbing[6] depths would change from a maximum of two feet for riverbank locations to about six feet for inland locations. Clearing and grubbing costs are currently $1.00 per yd^3.

[6] *Clearing and grubbing activities are performed prior to pumping sand and gravel slurries from the quarries. Clearing and grubbing describes the removal of vegetable matter from the surface and the loosening of the topsoil to reach the desirable product.*

6.0 Economic Impact of Habitat Restoration and Management

The proposed Program will require restoration and management of habitat complexes along the Platte River. These activities have the potential to provide a positive economic impact to the study area economy by increasing sales, income and employment (direct, indirect and induced). The economic impacts of restoration and management were estimated and are discussed below.

6.1 Summary of Results

Estimated restoration cost for each of the habitat blocks and segments are summarized in Appendix C as estimated with information from West, Inc., FWS and the Cottonwood Ranch Management Plan. The restoration of each habitat block or segment was assumed to occur according to the schedule provided in Section 4.0. It was also assumed for this analysis, that restoration on each block or segment would be completed by either 2004 or 2006. The restoration of Cottonwood Ranch is expected to occur during six phases starting in 2001 and continuing through 2006. Estimated management costs for each block or segment are also provided in Appendix C. Management activities were assumed to commence the year after restoration and to be more intense the first two years after restoration when habitat areas are being established.

The present value of restoration and management costs for each Scenario are summarized in Table 6.1-1 and include $4.96 million under Scenario 1, $3.5 million under Scenario 2 and $6.3 per million under Scenario 3.

Table 6.1-1
Total Present Value of Restoration and Management Cost (1998s)

	Present Value[1]
Scenario 1	$4,963,000
Scenario 2	$3,494,000
Scenario 3	$6,287,000

1 at 2.8% discount rate.

The estimated changes in income, sales, employment and indirect business taxes from restoration and management of habitat lands under Scenario 1 are summarized in Tables 6.1-2 and 6.1-3. The restoration of habitat will increase the present value of total income, sales and indirect business taxes by $4.7 million, $7.1 million and $452,000 dollars, respectively. These impacts are summarized in Table 6.1-2. Employment is also estimated to increase with the restoration and management of habitat lands. Table 6.1-3 summarizes the change in employment. Employment impacts vary each year as indicated in this table. Employment is estimated to increase by as much as 76 jobs in 2006 when a significant amount of restoration will be under way. Once restoration is complete and the Program is actively managing habitat lands,

employment is estimated to be 5.3 jobs higher each year from 2009 through 2020 than under baseline conditions.

The change in income, sales, employment and indirect business taxes under Scenario 2 is summarized in Tables 6.1-4 and 6.1-5. Under Scenario 2, restoration and management of habitat lands is estimated to increase the present value of total income, sales and indirect business taxes by $4.0 million, $6.1 million and $382,000, respectively as summarized in Table 6.1-4. Employment is also expected to increase under Scenario 2 and is summarized in Table 6.1-5. Relative to employment under the baseline condition, the number of jobs is expected to increase by 8.3 jobs in 2001, by 76 jobs in 2006 and 3.8 jobs each year from 2009 through 2020.

The estimated changes in income, sales, employment and indirect business taxes from restoration and management of habitat lands under Scenario 3 are summarized in Tables 6.1-6 and 6.1-7. The restoration of habitat will increase the present value of total income, sales and indirect business taxes by $6.1 million, $9.3 million and $575,000 dollars, respectively as summarized in Table 6.1-6. Employment is also estimated to increase with the restoration and management of habitat lands. Table 6.1-7 summarizes the change in employment. Employment is estimated to increase by as much as 179 jobs in 2004 when a significant amount of restoration will be under way. Once restoration is complete and the Program is actively managing habitat lands, employment is estimated to be 6.0 jobs higher each year from 2009 through 2020 than under baseline conditions.

Table 6.1-2
Habitat Reclamation Impacts on Total Income, Total Sales and Total Indirect Business Taxes in the Study Area (Direct, Indirect and Induced) - Scenario 1

	Change in Total Income – 1998$				Change in Total Sales - 1998$				Change in Indirect Business Taxes - 1998$			
Year	Block A	Block B	Cottonwood Ranch	Total	Block A	Block B	Cottonwood Ranch	Total	Block A	Block B	Cottonwood Ranch	Total
2001	$0	$0	$155,000	$155,000	$0	$0	$236,000	$236,000	$0	$0	$15,000	$15,000
2002	$0	$0	$244,000	$244,000	$0	$0	$371,000	$371,000	$0	$0	$23,000	$23,000
2003	$0	$0	$167,000	$167,000	$0	$0	$254,000	$254,000	$0	$0	$16,000	$16,000
2004	$1,078,000	$0	$240,000	$1,318,000	$1,640,000	$0	$365,000	$2,006,000	$103,000	$0	$23,000	$126,000
2005	$153,000	$0	$449,000	$602,000	$232,000	$0	$683,000	$915,000	$15,000	$0	$43,000	$58,000
2006	$153,000	$1,007,000	$252,000	$1,412,000	$232,000	$1,533,000	$384,000	$2,149,000	$15,000	$96,000	$24,000	$135,000
2007	$37,000	$176,000	$66,000	$279,000	$57,000	$267,000	$100,000	$424,000	$4,000	$17,000	$6,000	$27,000
2008	$37,000	$176,000	$44,000	$257,000	$57,000	$267,000	$67,000	$391,000	$4,000	$17,000	$4,000	$25,000
2009	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2010	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2011	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2012	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2013	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2014	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2015	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2016	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2017	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2018	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2019	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
2020	$37,000	$38,000	$23,000	$98,000	$57,000	$58,000	$36,000	$151,000	$4,000	$4,000	$2,000	$10,000
Present Value[1]	$1,587,000	$1,446,000	$1,630,000	$4,664,000	$2,420,000	$2,202,000	$2,488,000	$7,111,000	$157,000	$141,000	$154,000	$452,000

1 at 2.8% discount rate.

Table 6.1-3
Habitat Restoration Impacts on
Employment in the Study Area
(Direct, Indirect and Induced) - Scenario 1

	Change in Employment - Jobs			
Year	Block A	Block B	Cottonwood Ranch	Total
2001	0.0	0.0	8.3	8.3
2002	0.0	0.0	13.1	13.1
2003	0.0	0.0	9.0	9.0
2004	57.8	0.0	12.9	70.7
2005	8.2	0.0	24.1	32.3
2006	8.2	54.0	13.5	75.7
2007	2.0	9.4	3.5	14.9
2008	2.0	9.4	2.4	13.8
2009	2.0	2.0	1.3	5.3
2010	2.0	2.0	1.3	5.3
2011	2.0	2.0	1.3	5.3
2012	2.0	2.0	1.3	5.3
2013	2.0	2.0	1.3	5.3
2014	2.0	2.0	1.3	5.3
2015	2.0	2.0	1.3	5.3
2016	2.0	2.0	1.3	5.3
2017	2.0	2.0	1.3	5.3
2018	2.0	2.0	1.3	5.3
2019	2.0	2.0	1.3	5.3
2020	2.0	2.0	1.3	5.3

Table 6.1-4
Impact of Habitat Restoration and Management on Total Income, Total Sales and Total Indirect Business Taxes in the Study Area (Direct, Indirect and Induced) - Scenario 2

	Change in Total Income - 1998$					Change in Total Sales - 1998$					Indirect Business Taxes - 1998$				
Year	Segment A	Segment B	Segment C	Cottonwood Ranch	Total	Segment A	Segment B	Segment C	Cottonwood Ranch	Total	Segment A	Segment B	Segment C	Cottonwood Ranch	Total
2001	$0	$0	$0	$155,000	$155,000	$0	$0	$0	$236,000	$236,000	$0	$0	$0	$15,000	$15,000
2002	$0	$0	$0	$244,000	$244,000	$0	$0	$0	$371,000	$371,000	$0	$0	$0	$23,000	$23,000
2003	$0	$0	$0	$167,000	$167,000	$0	$0	$0	$254,000	$254,000	$0	$0	$0	$16,000	$16,000
2004	$682,000	$0	$0	$240,000	$922,000	$1,038,000	$0	$0	$365,000	$1,403,000	$65,000	$0	$0	$23,000	$88,000
2005	$97,000	$0	$0	$449,000	$546,000	$147,000	$0	$0	$683,000	$830,000	$9,000	$0	$0	$43,000	$52,000
2006	$97,000	$561,000	$508,000	$252,000	$1,418,000	$147,000	$854,000	$773,000	$384,000	$2,158,000	$9,000	$54,000	$48,000	$24,000	$135,000
2007	$29,000	$80,000	$66,000	$66,000	$241,000	$44,000	$121,000	$100,000	$100,000	$365,000	$3,000	$8,000	$6,000	$6,000	$23,000
2008	$29,000	$80,000	$66,000	$44,000	$219,000	$44,000	$121,000	$100,000	$67,000	$332,000	$3,000	$8,000	$6,000	$4,000	$21,000
2009	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2010	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2011	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2012	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2013	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2014	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2015	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2016	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2017	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2018	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2019	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
2020	$29,000	$8,000	$12,000	$23,000	$72,000	$44,000	$12,000	$18,000	$36,000	$110,000	$3,000	$1,000	$1,000	$2,000	$7,000
Present Value[1]	$1,059,000	$670,000	$635,000	$1,630,000	$3,994,000	$1,609,000	$1,017,000	$963,000	$2,488,000	$6,078,000	$103,000	$67,000	$59,000	$154,000	$382,000

1 at 2.8% discount rate.

Table 6.1-5
Impact of Habitat Restoration and Management on Employment in the Study Area (Direct, Indirect and Induced) - Scenario 2

	Change in Employment - Jobs				
Year	Segment A	Segment B	Segment C	Cottonwood Ranch	Total
2001	0.0	0.0	0.0	8.3	8.3
2002	0.0	0.0	0.0	13.1	13.1
2003	0.0	0.0	0.0	9.0	9.0
2004	36.6	0.0	0.0	12.9	49.5
2005	5.2	0.0	0.0	24.1	29.3
2006	5.2	30.1	27.2	13.5	76.0
2007	1.5	4.3	3.5	3.5	12.8
2008	1.5	4.3	3.5	2.4	11.7
2009	1.5	0.4	0.6	1.3	3.8
2010	1.5	0.4	0.6	1.3	3.8
2011	1.5	0.4	0.6	1.3	3.8
2012	1.5	0.4	0.6	1.3	3.8
2013	1.5	0.4	0.6	1.3	3.8
2014	1.5	0.4	0.6	1.3	3.8
2015	1.5	0.4	0.6	1.3	3.8
2016	1.5	0.4	0.6	1.3	3.8
2017	1.5	0.4	0.6	1.3	3.8
2018	1.5	0.4	0.6	1.3	3.8
2019	1.5	0.4	0.6	1.3	3.8
2020	1.5	0.4	0.6	1.3	3.8

Table 6.1-6
Impact of Habitat Restoration and Management on Total Income, Total Sales and Total Indirect Business Taxes in the Study Area (Direct, Indirect and Induced) - Scenario 3

	Change in Total Income - 1998$			Change in Total Sales - 1998$			Indirect Business Taxes - 1998$		
Year	Scatter Blocks	Cottonwood Ranch	Total	Scatter Blocks	Cottonwood Ranch	Total	Scatter Blocks	Cottonwood Ranch	Total
2001	$0	$155,000	$155,000	$0	$236,000	$236,000	$0	$15,000	$15,000
2002	$0	$244,000	$244,000	$0	$371,000	$371,000	$0	$23,000	$23,000
2003	$0	$167,000	$167,000	$0	$254,000	$254,000	$0	$16,000	$16,000
2004	$3,098,000	$240,000	$3,338,000	$4,716,000	$365,000	$5,081,000	$295,000	$23,000	$318,000
2005	$478,000	$449,000	$927,000	$727,000	$683,000	$1,410,000	$46,000	$43,000	$89,000
2006	$478,000	$252,000	$730,000	$727,000	$384,000	$1,111,000	$46,000	$24,000	$70,000
2007	$87,000	$66,000	$153,000	$133,000	$100,000	$233,000	$8,000	$6,000	$14,000
2008	$87,000	$44,000	$131,000	$133,000	$67,000	$200,000	$8,000	$4,000	$12,000
2009	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2010	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2011	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2012	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2013	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2014	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2015	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2016	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2017	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2018	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2019	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
2020	$87,000	$23,000	$110,000	$133,000	$36,000	$169,000	$8,000	$2,000	$10,000
Present Value[1]	$4,440,000	$1,630,000	$6,070,000	$6,763,000	$2,488,000	$9,251,000	$421,000	$154,000	$575,000

1 at 2.8% discount rate.

Table 6.1-7
Impact of Habitat Restoration and Management on Employment in the Study Area (Direct, Indirect and Induced)
Scenario 3

	Change in Employment - Jobs		
Year	Scatter Blocks	Cottonwood Ranch	Total
2001	0.0	8.3	8.3
2002	0.0	13.1	13.1
2003	0.0	9.0	9.0
2004	166.3	12.9	179.2
2005	25.6	24.1	49.7
2006	25.6	13.5	39.1
2007	4.7	3.5	8.2
2008	4.7	2.4	7.1
2009	4.7	1.3	6.0
2010	4.7	1.3	6.0
2011	4.7	1.3	6.0
2012	4.7	1.3	6.0
2013	4.7	1.3	6.0
2014	4.7	1.3	6.0
2015	4.7	1.3	6.0
2016	4.7	1.3	6.0
2017	4.7	1.3	6.0
2018	4.7	1.3	6.0
2019	4.7	1.3	6.0
2020	4.7	1.3	6.0

6.2 Methodology

To estimate the economic impacts of restoration and management of habitat lands, the following methodology was used.

Step 1 Identify the land areas and restoration and/or management action that would be required to provide habitat under each Habitat Scenario

The FWS utilized the GIS database to identify areas that would require habitat restoration within each of the protected blocks or segments. The FWS provided this information to Hazen and Sawyer as well as the habitat goal for each area. For instance, Habitat Block A under Scenario 1 would require 604 acres of wooded areas to be converted to wet meadows. Summaries of the restoration acreage estimates for each Habitat Scenario are provided in Appendix C.

Step 2 Identify the restoration and/or management action and cost that would be required for each habitat block or segment

Information provided in a Draft Report completed by West, Inc.1 was used to estimate the restoration and management actions needed to restore each habitat type. The study provided results of a survey of land managers in Nebraska who have experience with relevant habitats as well as a literature search of appropriate management techniques. The report was used to estimate the restoration and management technique that may be used under the Program to restore each habitat type (e.g. wet meadows). Additionally, the cost per acre for each relevant restoration and management technique was estimated from information provided in this report. Table 6.2-1 and 6.2-2 summarizes the restoration and management actions and costs that were used to estimate costs for each habitat block or segment.

Step 3 Estimate the total cost of restoration and management for each area

The total cost for restoration and management for each area was estimated by multiplying the number of acres requiring restoration and management under each block or segment by the restoration and management cost per acre. The present value of habitat restoration and management for each scenario is provided in Table 6.1-1. The difference in present value cost for each of the scenarios is due to the difference in land covers that would be converted to habitat. For instance, Scenario 3 would require more wooded acres to be converted to wet meadows and/or grassland areas. The cost to convert wooded areas to wet meadows and grasslands is higher than other types of restoration. Therefore, Scenario 3 would require more capital investment to restore habitat.

1 *Western Ecosystems Technology, Inc. "Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000. Cheyenne, Wyoming.*

Table 6.2-1
Example Restoration Cost for Protected Habitat

Land Cover Alteration	Restoration Needed	Cost per Acre
Bare Sand converted from: Woody (WO); Herbaceous on Island (HI); Shrubs on Island (SI); Woody on Island (WI);	Tree Clearing	$900
	Brush Clearing	$200
	"Other" Dirt Work	$725
Wetland Rehabilitation converted from: Channel (CH); Beach/Bar (BB); Herbaceous on Island (HI); Shrubs inside Floodplain (SH); Herbaceous (HE); Woody on Island (WI)	Tree Clearing	$900
	Brush Clearing	$200
	High Density Seeding	$300
	"Other" Dirt Work	$725
Wet Meadows converted from: Woody (WO)	Tree Clearing	$900
	High Density Seeding	$300
	Land Contouring	$200
Grasslands converted from: Woody (WO)	Tree Clearing	$900
	High Density Seeding	$300
	Land Contouring	$200
Wet Meadows converted from: Alfalfa (AL); Corn (CO); Other Crops (OC); Grassland (GR)	Land Contouring	$200
	High Density Seeding	$300
Grasslands converted from: Alfalfa (AL); Corn (CO); Other Crops (OC); Grassland (GR)	Land Contouring	$200
	High Density Seeding	$300
Abandoned Sand and Gravel Pit	No Restoration Needed	

[a] *Except where noted, the restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes, Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.*

Table 6.2-2
Example Maintenance Cost for Protected Habitat

Land Cover Alteration	Management Activity	Frequency	Cost per Acre	Annual Cost Per Acre
Bare Sand converted from: Woody (WO); Herbaceous on Island (HI); Shrubs on Island (SI); Woody on Island (WI);	Mowing and Shredding of woody vegetation with Klearway	Annually for two years then three out of four years for remaining study period.	$200	$150
	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Wetland Rehabilitation converted from: Channel (CH); Beach/Bar (BB); Herbaceous on Island (HI); Shrubs inside Floodplain (SH); Herbaceous (HE); Woody on Island (WI)	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Wet Meadows converted from: Woody (WO)	Mowing and Shredding of woody vegetation with Klearway	Annually for two years then three out of four years for remaining study period.	$200	$150
	Grazing or Haying and Burning after grass establishment	Annual Grazing and Haying; Burning once every four years	$18	$5
	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Grasslands converted from: Woody (WO)	Mowing and Shredding of woody vegetation with Klearway	Annually for two years then three out of four years for remaining study period.	$200	$150
	Grazing and Burning after grass establishment in two years	Annual Grazing; Burning once every four years	$18	$5
	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Wet Meadows converted from: Alfalfa (AL); Corn (CO); Other Crops (OC); Grassland (GR)	Grazing and Burning after grass establishment in two years	Annual Grazing; Burning once every four years	$18	$5
	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Grasslands converted from: Alfalfa (AL); Corn (CO); Other Crops (OC); Grassland (GR)	Grazing and Burning after grass establishment in two years	Annual Grazing; Burning once every four years	$18	$5
	Spot Control of Weeds	20% of acreage would be treated annually	$40	$8
Abandoned Sand and Gravel Pit	Discing for vegetation Control	Annually	$100	$100

[a] *Except where noted, the restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.*

Step 4 Apply economic direct annual multipliers to restoration and management cost estimates to estimate changes in sales, employment, income and indirect business taxes with restoration and management of Program lands

Economic impacts were then estimated as the product of restoration and management costs and the economic multipliers associated with "agriculture, forestry and fishery services" presented in Table 5.4-9 in subsection 5.4. These multipliers are considered to best represent the types of industries that would provide land-based habitat management services. The resulting economic impacts are based on the assumption that the businesses and employees who would provide the management services are located within the study area.

7.0 Economic Impact of Increased Recreation

This section describes the economic impact in the study area as the Program impacts local recreation expenditures. The purpose of the Program is to protect endangered species, including the whooping crane, the piping plover and the least tern. To this end, public activities on Program lands are expected to be limited. At best, only two recreation activities would be made available: waterfowl hunting and bird watching. The waterfowl hunting seasons along the Platte River run from about early October through January. Hunting during this time would be restricted in areas where endangered species are sited so that hunting would remain compatible with the objective of the Program. The prime bird watching season extends for five weeks during the spring.

The habitat restoration areas have the potential to provide valuable hunting and bird watching opportunities along the Platte River. Waterfowl hunting and bird watching along the Central Platte River are popular recreation activities. Pheasant, geese and/or duck hunting are allowed at wildlife management areas, private clubs and private lands along the river during their respective seasons. Hunting is one of the most economically valuable land uses along the river because hunters are willing to pay relatively high fees for the privilege.

Because the Central Platte River is an important part of the Central Flyway, the area is teaming with migratory birds during five weeks in the Spring. The study area is known for its large concentrations of sandhill crane during this period. Visitors come to experience the beauty and sounds of over ten million migratory waterfowl including cranes, ducks and geese. In the study area, bird watching tours are offered at the National Audubon Society's Rowe Sanctuary, and at the Crane Meadows Nature Center. The U.S. Fish and Wildlife Service also offers viewing sites. Public viewing areas include the Fort Kearney Hike-Bike Trail and the Central Platte Natural Resource District's viewing platforms located throughout the area.

The Program could potentially increase the number of hunting and bird watching days and recreation expenditures in the study areas under two conditions.

1. The Program provides public access to some or all of the affected parcels.

2. In areas where public access is provided, the Program provides blinds and toilets for hunters and bird watchers.

Increases in expenditures by recreators will be greatest if public access and certain amenities are provided. Expenditures will increase to a much lower extent if only public access is provided. If neither of these conditions is met, recreation expenditures are not expected to change as a result of land use changes under the Program.

The recreation amenities to be provided at the new habitat-protected areas are expected to be limited to that necessary to support hunting and bird watching. For the purposes of this study, only necessary road access, hunting blinds, viewing blinds and toilets will be provided at the

Program management areas. No trails, educational buildings or other infrastructure will be provided.

7.1 Summary of Results

The additional number of hunting and bird watching blinds to be provided in the Program habitat management areas were estimated based on interviews with the FWS, Nebraska Public Power District (NPPD), Nebraska Game and Parks, and Central Nebraska Public Power and Irrigation District. From these interviews, it was assumed that the Program could provide additional bird watching and hunting blinds on Program lands.

Given this information, the number of additional hunting blinds to be provided in the Program management areas was based on the increase in Platte River frontage to be made available for hunting. Additionally, it was assumed that blinds would be built in areas that are presently not suitable for hunting but would become suitable under the Program after habitat restoration is complete. For instance, hunting blinds would be constructed in areas that are currently wooded but would be converted to wet meadows or native grass areas. Likewise, the number of additional bird viewing blinds was based on the number of blocks or segments in the Habitat Scenarios. This was based on information provided by FWS who indicated that it may be feasible to put one viewing blind per block or segment.

At Cottonwood Ranch, it was assumed that five additional hunting blinds and no bird watching blinds would be provided as a result of the Program. This was based on information provided by NPPD. At this time there are existing hunting blinds on part of the Cottonwood property that are leased to a private party. NPPD indicated that there is a potential to increase the number of blinds on the property and make them available to the public. NPPD has no plans at this time to construct bird watching facilities on the Cottonwood Ranch Property.

The number of additional miles of Platte riverfront open to hunting, the number of additional hunting blinds and the number of additional bird viewing blinds to be provided by the Program are summarized in Table 7.1-1 for Scenario 1, Scenario 2 and Scenario 3.

Recreation-Related Impacts Under Scenario 1. The impacts of the Program on expenditures by recreators, total employment, total income, total sales and total indirect business taxes for Scenario 1 for each year of the study period are provided in Table 7.1-2a and b. These impacts are expected because an increase in recreation-days spent in the study area translates into increased spending in the study area for food, lodging, gasoline, fees and other entertainment.

Table 7.1-1
Impact of Habitat Component of the Proposed Platte River Recovery Implementation Program on Number of Blinds for Hunting and Bird Watching

Segment/Block	Increase in River Frontage Available for Hunting (feet)	Increase in Number of Hunting Blinds	Increase in Number of Bird Viewing Blinds
	Scenario 1		
Block A	7,400	5	1
Block B	10,640	8	1
Cottonwood Ranch	6,336	5	0
Total	*24,376*	*18*	2
	Scenario 2		
Segment A	7,532	5	1
Segment B	11,000	8	1
Segment C	10,480	8	1
Cottonwood Ranch	6,336	5	0
Total	35,348	26	3
	Scenario 3		
Cottonwood Ranch	6,336	5	0

Note: Number of blinds based on 4 hunting blinds per mile of additional riverfront available for hunting.

The number of recreation days is expected to increase to 3,261 recreation-days per year by the year 2006, when all of the recreation amenities are expected to be in place. The increased recreation activities will increase recreator expenditures in the study area by $166,000 per year. As a result, total sales in the study area will increase by $243,000 per year. This sales increase will expand total employment in the study area by 6 jobs. Total income in the study area will increase by $114,000 per year and total indirect business taxes collected in the study area will increase by $20,000 per year. Over the twenty-year study period, the present value of this additional total income in the study area will be $1.3 million. The present value of the additional total sales in the study area will be $2.8 million and the present value of the additional indirect business taxes will be $228,000.

Table 7.1-2a
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, indirect and induced)
Scenario 1

	Number of Additional Blinds		Change in Number of Net Recreation-Days			Change in Recreator Expenditures			Change in Total Employment - Jobs		
Year	Hunting	Bird Watching	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	0	0	0	0	0	$0	$0	$0	0	0	0
2002	0	0	0	0	0	$0	$0	$0	0	0	0
2003	2	0	185	0	185	$8,000	$0	$8,000	0	0	0
2004	7	1	646	800	1,446	$27,000	$48,000	$75,000	1	2	3
2005	7	1	646	800	1,446	$27,000	$48,000	$75,000	1	2	3
2006	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2007	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2008	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2009	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2010	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2011	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2012	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2013	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2014	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2015	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2016	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2017	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2018	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2019	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
2020	18	2	1,661	1,600	3,261	$70,000	$96,000	$166,000	3	3	6
Present Value[1]						$794,000	$1,098,000	$1,891,000			

[1] *at 2.8 percent discount rate.*
[2] *Columns containing values for blinds, recreational days and employment are not additive in this table.*

Table 7.1-2b
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, indirect and induced)
Scenario 1

Year	Change in Total Income - 1998$			Change in Total Sales - 1998$			Change in Indirect Business Taxes - 1998$		
	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	$0	$0	$0	$0	$0	$0	$0	$0	$0
2002	$0	$0	$0	$0	$0	$0	$0	$0	$0
2003	$6,000	$0	$6,000	$12,000	$0	$12,000	$1,000	$0	$1,000
2004	$20,000	$31,000	$51,000	$42,000	$68,000	$110,000	$4,000	$5,000	$9,000
2005	$20,000	$31,000	$51,000	$42,000	$68,000	$110,000	$4,000	$5,000	$9,000
2006	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2007	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2008	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2009	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2010	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2011	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2012	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2013	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2014	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2015	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2016	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2017	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2018	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2019	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
2020	$51,000	$63,000	$114,000	$108,000	$135,000	$243,000	$9,000	$11,000	$20,000
Present Value[1]	$579,000	$719,000	$1,298,000	$1,225,000	$1,544,000	$2,769,000	$103,000	$125,000	$228,000

[1] *at 2.8 percent discount rate.*

Table 7.1-3a
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, Indirect and Induced)
Scenario 2

	Number of Additional Blinds		Change in Number of Net Recreation-Days			Change in Recreator Expenditures			Change in Total Employment - Jobs		
Year	Hunting	Bird Watching	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	0	0	0	0	0	$0	$0	$0	0	0	0
2002	0	0	0	0	0	$0	$0	$0	0	0	0
2003	2	0	185	0	185	$8,000	$0	$8,000	0	0	0
2004	7	1	646	800	1,446	$27,000	$48,000	$75,000	1	2	3
2005	7	1	646	800	1,446	$27,000	$48,000	$75,000	1	2	3
2006	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2007	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2008	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2009	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2010	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2011	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2012	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2013	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2014	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2015	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2016	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2017	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2018	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2019	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
2020	26	3	2,399	2,400	4,799	$100,000	$143,000	$243,000	4	5	9
Present Value[1]						$1,110,000	$1,593,000	$2,704,000			

[1] *at 2.8 percent discount rate.*
[2] *Columns containing values for blinds, recreational days and employment are not additive in this table.*

Table 7.1-3b
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, indirect and induced)
Scenario 2

	Change in Total Income - 1998$			Change in Total Sales - 1998$			Change in Indirect Business Taxes - 1998$		
Year	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	$0	$0	$0	$0	$0	$0	$0	$0	$0
2002	$0	$0	$0	$0	$0	$0	$0	$0	$0
2003	$6,000	$0	$6,000	$12,000	$0	$12,000	$1,000	$0	$1,000
2004	$20,000	$31,000	$51,000	$42,000	$68,000	$110,000	$4,000	$5,000	$9,000
2005	$20,000	$31,000	$51,000	$42,000	$68,000	$110,000	$4,000	$5,000	$9,000
2006	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2007	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2008	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2009	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2010	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2011	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2012	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2013	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2014	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2015	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2016	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2017	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2018	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2019	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
2020	$74,000	$94,000	$168,000	$156,000	$203,000	$359,000	$13,000	$16,000	$29,000
Present Value[1]	$822,000	$1,046,000	$1,868,000	$1,731,000	$2,262,000	$3,993,000	$145,000	$178,000	$323,000

[1] *at 2.8 percent discount rate.*

Table 7.1-4a
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, indirect and induced)
Scenario 3

	Number of Additional Blinds		Change in Number of Net Recreation-Days			Change in Recreator Expenditures			Change in Total Employment - Jobs		
Year	Hunting	Bird Watching	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	0	0	0	0	0	$0	$0	$0	0	0	0
2002	0	0	0	0	0	$0	$0	$0	0	0	0
2003	2	0	184	0	184	$8,000	$0	$8,000	0	0	0
2004	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2005	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2006	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2007	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2008	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2009	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2010	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2011	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2012	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2013	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2014	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2015	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2016	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2017	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2018	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2019	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
2020	5	0	460	0	460	$19,000	$0	$19,000	1	0	1
Present Value[1]						$241,000	$0	$241,000			

[1] *at 2.8 percent discount rate.*
[2] *Columns containing values for blinds, recreational days and employment are not additive in this table.*

Table 7.1-4b
Program Impact on Recreation Expenditures, Total Employment, Total Income, Total Sales and Total Indirect Business Taxes (Direct, indirect and induced)
Scenario 3

	Change in Total Income - 1998$			Change in Total Sales - 1998$			Change in Indirect Business Taxes - 1998$		
Year	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total	Hunting	Bird Watching	Total
2001	$0	$0	$0	$0	$0	$0	$0	$0	$0
2002	$0	$0	$0	$0	$0	$0	$0	$0	$0
2003	$6,000	$0	$6,000	$12,000	$0	$12,000	$1,000	$0	$1,000
2004	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2005	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2006	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2007	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2008	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2009	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2010	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2011	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2012	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2013	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2014	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2015	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2016	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2017	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2018	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2019	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
2020	$14,000	$0	$14,000	$30,000	$0	$30,000	$3,000	$0	$3,000
Present Value[1]	$178,000	$0	$178,000	$381,000	$0	$381,000	$38,000	$0	$38,000

[1] *at 2.8 percent discount rate.*

Recreation-Related Impacts Under Scenario 2. The impacts of the Program on expenditures by recreators, total employment, total income, total sales and total indirect business taxes for Scenario 2 for each year of the study period are provided in Table 7.1-3a and b. These impacts are expected because an increase in recreation-days in the study area translates into increased spending in the study area for food, lodging, gasoline, fees and other entertainment.

The number of recreation days is expected to increase to 4,799 recreation-days per year by the year 2006, when all of the recreation amenities are expected to be in place. The increased recreation activities will increase recreator expenditures in the study area by $243,000 per year. As a result, total sales in the study area will increase by $359,000 per year. This sales increase will expand total employment in the study area by 9 jobs. Total income in the study area will increase by $168,000 per year and total indirect business taxes collected in the study area will increase by $29,000 per year.

Over the twenty-year study period, the present value of this additional total income in the study area will be $1.9 million. The present value of the additional total sales in the study area will be $4.0 million and the present value of the additional indirect business taxes will be $323,000.

Recreation-Related Impacts under Scenario 3. It was assumed for this analysis that additional recreational opportunities would be limited to those being offered at Cottonwood Ranch. This assumption was based on input from the FWS that indicated the size of the segments protected under Scenario 3 would not be large enough to support additional recreation. Therefore, under this scenario, the Program would provide five additional hunting blinds at Cottonwood Ranch only.

The impact of additional recreational opportunities under Scenario 3 is summarized in Table 7.4a and b. These two tables summarize the impact of the additional recreational opportunities on recreational expenditures, employment, income, sales and indirect business taxes. The number of recreation days is expected to increase to 460 recreation-days per year by the year 2004, when all of the recreation amenities are expected to be in place. The increased recreation activities will increase recreator expenditures in the study area by $19,000 per year. As a result, total sales in the study area will increase by $30,000 per year. This sales increase will expand total employment in the study area by 1 job. Total income in the study area will increase by $14,000 per year and total indirect business taxes collected in the study area will increase by $3,000 per year.

Over the twenty-year study period, the present value of this additional total income in the study area will be $178,000. The present value of the additional total sales in the study area will be $381,000 and the present value of the additional indirect business taxes will be $38,000.

7.2 Methodology - Hunting

This section describes the methods used to estimate the additional hunting expenditures and economic impact associated with increasing hunting land area along the Platte River.

Impact of Additional Hunting Land on Hunting Days. Increases in sales, income and employment in the study areas are expected to occur if the number of visitor-days spent hunting increases due to the addition of habitat-protected lands that have public access for hunting and one or more hunting blinds. It was estimated that the Program could lead to an additional 1,661, 2,399, and 460 hunting days per year for Scenario 1, 2 and 3, respectively. The estimate was calculated as follows.

The potential increase in 185 waterfowl hunting days per blind per year was estimated and based on the following factors [1].

- Waterfowl hunting season extends from October through January or about 123 days per year.
- On average, three hunters use each blind every other day during the hunting season. This assumption provides a lower bound estimate of capacity per blind. It was developed to account for potential hunting restrictions during the season as endangered species are sited in these areas.

While the Program may increase potential recreation opportunities in the study area, it is likely that the additional recreational visitor days experienced on Program lands would not translate into a 100% net increase in recreation visitor days to the study area. This is due to the fact that individuals who use the recreational facilities provided by the Program may be simply substituting a recreational use from another facility in the study area. To account for this substitution affect, it was assumed that additional recreational visitor days provided by the Program would result in a 50% net increase in recreational visitor days to the study area or 92 days per blind. Therefore, hunting days will increase by 1,661 with the addition of 18 new blinds under Scenario 1. Under Scenario 2, hunting days are expected to increase by 2,399 with the addition of 26 blinds. Scenario 3 will result in 460 additional hunting days per year when five additional hunting blinds are constructed.

Expenditures By Hunters. Those who hunt along the Platte River spend money in the study area to support their hunting activities. Hunters visiting from out of town spend money on gasoline, food, lodging, and permits. Hunters who live within the study area spend money on hunting equipment and permits. The average daily amount of money spent by hunters within the study area was based on estimates of hunting expenditures associated with those who hunt in Nebraska. This information is reported in the 1996 National Survey of Fishing, Hunting and

[1] *The estimate of additional hunting days per hunting blind sited along the Platte River was calculated based on hunting-related information supplied by the Nebraska Game and Parks Commission, Lincoln, Nebraska, October 1999.*

Wildlife-Associated Recreation, pages 24, 28 and 30 published by the U.S. Fish and Wildlife Service[2].

These itemized expenditures are reported in Table 7.2-1 and total $70.97 of expenditures in Nebraska per day of hunting in Nebraska by both in-state and out-of-state residents, on-average. To apply this information to the study area, key assumptions were made. For instance, it was assumed that hunters would only purchase a percentage of equipment and other hunting items within the study area. Thus, the third column of Table 7.2-1 itemizes the daily expenditures by hunters within the study area. Each expenditure within each category is the average across all migratory bird hunters, not just those who had expenditures in that category. The estimated expenditures within the study area total $42.89 per hunting day.

Table 7.2-1
Average Expenditures of the Nebraska Hunter per Hunting Day

Expenditure Category	Daily Expenditures in Nebraska by those who Hunt in Nebraska[A]	Daily Expenditures in the Study Area by those who Hunt in the Study Area
Lodging[B]	$2.76	$2.81
Food	$12.05	$12.05
Transportation	$13.04	$13.04
Other trip costs	$1.28	$1.28
Equipment	$17.62	$7.77
Other hunting cost[C]	$24.22	$5.94
Total	$70.97	$42.89

A U.S. Fish and Wildlife Service, 1996 National Survey of Fishing, Hunting and Wildlife-Related Recreation - Nebraska, pages 24, 28 and 30.

B Page 28 of the 1996 National Survey reports "Food and Lodging" as one category ($14.81). This category was split into a "Food" category and a "Lodging" category based on information provided on page 30 of the survey report.

C Includes bows, arrows, archery equipment, telescopic sights, decoys and game calls, hand loading equipment and components, hunting dogs and associated costs, hunting knives, and other hunting equipment.

7.3 Methodology – Bird Watching

This section describes the methods used to estimate the additional bird watching expenditures and economic impact associated with increased land area along the Platte River available for bird watching.

Impact of Additional Bird Watching Opportunities on Bird Watching Days. Increases in sales, income and employment in the study areas are expected to occur if the number of visitor-days spent bird watching increases due to the addition of habitat-protected lands that have public access for viewing, especially if viewing blinds and clean toilets are provided. Because the purpose of habitat restoration is to protect the whooping crane, piping plover and least tern, it seems unlikely that the Program will allow unrestricted public access to these new areas. Thus,

2 *U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census, "1996 National Survey of Fishing, Hunting and Wildlife-Associated Recreation - Nebraska", Washington, D.C.*

if public access for bird watching is allowed, it seems logical that special viewing areas would be provided. Therefore, if bird watching is allowed on these lands, this study presumes that viewing blinds and chemical toilets will be provided.

It was estimated that the Program could lead to an additional 1,600 and 2,400 bird watching days per year under Scenario 1 and Scenario 2, respectively. The additional recreational visitor days would be the result of adding two new blinds under Scenario 1 and three new blinds under Scenario 2. Under both scenarios, it was estimated that new blinds would lead to 800 additional bird watching days per blind per year. This estimate was calculated as follows.

This estimate is based on the number of bird watching days at the Rowe Sanctuary in Gibbon operated by the National Audubon Society. The 1,150-acre Sanctuary extends 4 miles along the Platte River and is managed to provide habitat for sandhill cranes, whooping cranes and other birds. Groups of bird watchers are guided to one of four viewing blinds. These blinds are enclosed wooden buildings from which bird watchers can view these birds as they congregate along the river. Clean chemical toilets are provided. The blind trips are available every morning and evening during the five-week bird watching season for a fee of $15 per person. The Sanctuary also has a hiking trail. No other types of recreation are available at this site.

During the 1999 five-week bird watching season, 6,400 bird watching days were enjoyed at the four viewing blinds provided at Rowe Sanctuary. This is close to the capacity of the Sanctuary during the five-week season. The number of bird watching days per blind is the ratio of 6,400 and the 4 blinds provided at the Sanctuary or 1,600 bird watching days per blind. The blinds vary in size from 15-person to 36-person capacity. The average blind holds 23 people.

The demand for bird watching sites during the five-week season is very large relative to the supply of high quality bird watching sites. The supply of high quality bird watching sites is dependent, not only on the number of areas with access to viewing blinds, but also on the behavior of the birds. Therefore, providing additional viewing blinds will only increase recreational opportunities if the birds utilize areas near the blinds. Also, it is likely that some individuals that utilize the facilities provided on Program lands would simply substitute a similar recreational use from another area. Given this information, it was assumed that the Program would provide a 50% net increase in the number of bird watching days or 800 recreational visitor days per blind per year. Therefore, bird watching days will increase by 1,600 with the addition of two blinds under Scenario 1. Under Scenario 2, bird watching days will increase by 2,400 with the addition of three bird watching blinds.

Expenditures by Bird Watchers. Those who bird watch along the Platte River spend money in the study area to support their bird watching activities. Bird watchers visiting from out of town spend money on gasoline, food, lodging, and site fees. Bird watchers who live within the study area spend money on gasoline and site fees. The average daily amount of money spent by bird watchers within the study area was estimated based on the estimated expenditures of Platte River bird watchers reported in the 1998 study by Fermata, Inc. for the U.S. EPA, Region VII. This study is titled, "Platte River Nature Recreation Study, The Economic Impact of Wildlife

Watching On the Platte River, Nebraska"3. This study covers a 17-county area along the middle Platte River. These expenditures are itemized in Table 7.3-1. The last column includes those expenditures that would be expected in the 9-county third party impact study area. Each expenditure category is the average across all bird watchers, not just those who had expenditures in that category. Average daily expenditures in the study area per bird watching day are estimated to be $59.77.

Table 7.3-1
Average Daily Expenditure Per Bird Watcher
Middle Platte River, Nebraska

	Expenditures Per Person Per Day	
Expenditure Category	**Within the 17-County Middle Platte River Study Area**	**Within the 9-County Third Party Impact Study Area**
Airplane / Train Travel	$6.24	$0.00
Rental Vehicle	$2.60	$0.00
Personal Vehicle	$8.58	$8.58
Hotel Lodging	$23.75	$23.75
Camping	$0.34	$0.34
R/V Park	$0.12	$0.12
Bed & Breakfast	$0.70	$0.70
Restaurants	$17.30	$17.30
Groceries	$3.23	$3.23
Souvenirs	$5.75	$5.75
Total	**$68.61**	**$59.77**

A *Fermata, Inc. "Platte River Nature Recreation Study, The Economic Impact of Wildlife Watching on the Platte River in Nebraska," Austin, Texas, prepared for the U.S. Environmental Protection Agency, Region VII, February 15, 1998, Appendix 15.*

7.4 Methodology – Total Economic Impact as Program Affects Recreation

Total economic impacts include the changes in direct, indirect and induced sales, income and employment from a change in direct sales of the target industry. In the case of recreation expenditures, a change in the number of visitor days spent hunting or bird watching will change sales of local service industries including hotels, restaurants, service stations and grocery stores. The economic input-output multipliers for the 9-county study are provided in Table 7.4-1. These multipliers translate a change in direct sales within the study area into changes in total direct, indirect and induced sales, income, employment and indirect business taxes within the study area. Indirect business taxes are taxes paid by individuals to businesses and include sales and excise taxes.

3 *Fermata, Inc., "Platte River Nature Recreation Study, The Economic Impact of Wildlife Watching On the Platte River in Nebraska", Austin, Texas, Prepared for the U.S. Environmental Protection Agency, Region VII, February 15, 1998.*

Table 7.4-1
Economic (Input-Output) Multipliers for the Third Party Impact Study Area
Recreation-Related Industries – Direct, Indirect and Induced Multipliers[A]

	9-County Study Area			
Target Industry	Sales	Income	Employment	Indirect Business Taxes (Sales and Excise)
(1)	(2)	(3)	(4)	(5)
Hotels and Lodging Places	1.59	0.71	37.85	0.12
Eating and Drinking Places	1.58	0.64	43.58	0.09
Food Stores (groceries, hunting-other trip costs)	1.49	0.97	51.64	0.18
Automotive Dealers and Service Stations (gasoline, personal vehicle)	1.50	0.86	31.07	0.19
Miscellaneous Retail	1.53	0.87	63.27	0.17
Membership – Sports and Recreation Clubs (hunting-other items)	1.59	0.77	45.66	0.12

A *From Nebraska IMPLAN Model developed by the Minnesota IMPLAN Group, 1998. The sales multiplier represents change in total direct, indirect and induced sales per $1 change in direct sales of the target industry. The income multiplier represents change in total direct, indirect and induced income per $1 change in direct sales of the target industry. Income includes employee compensation, personal income, proprietor's income, and other property type income. The employment multiplier represents change in total direct, indirect and induced employment in number of jobs per $1 million change in direct sales of the target industry. The multiplier for indirect business taxes represents the change in total direct, indirect and induced excise and sales taxes paid by individuals to businesses per $1 change indirect sales of the target industry.*

The relevant industries represented in the table are (1) hotels and lodging places; (2) eating and drinking establishments (restaurants); (3) automotive dealers & service stations (gasoline, vehicle service); (4) food stores; and (5) membership sports and recreation clubs. These multipliers measure the change in total direct, indirect and induced sales, income, employment and indirect business taxes that will result from a change in sales of recreation-related industries. The estimated additional itemized recreation expenditures, as provided in the tables above, were multiplied by the respective multipliers.

7.5 Financial and Local Economic Impact from Constructing Hunting and Bird Watching Blinds

The cost to construct the hunting and bird watching blinds in the Program management areas is not included in the habitat management scenario costs used to estimate local economic impacts. In addition, this cost is directly associated with providing additional recreation opportunities along the Platte River and does not necessarily improve endangered species habitat along the Platte River. Therefore, the cost to construct the blinds and the associated infrastructure was estimated based on cost information obtained from the Nebraska Game and Parks Commission. These costs are provided in Table 7.5-1.

The capital cost to construct a fully-enclosed wooden hunting blind that is handicapped-accessible, has a capacity of five people, and is associated with a 20' x 20' parking pad and

sidewalk is about $5,800. The capital cost to construct a fully-enclosed wooden bird watching blind that is handicapped-accessible (ground level), has a capacity of 23 people, and is associated with a 40' x 40' parking pad and sidewalk is about $13,500.

Table 7.5-1
Estimated Capital Cost to Construct a Hunting and a Bird Watching Blind

Cost Item	Hunting Blind – Cost	Bird Watching Blind - Cost
Capacity in persons	6	23
Size of parking pad	20' x 20'	40' x 40'
Parking Pad and 280 foot sidewalk, 4 feet wide	$4,500	$9,000
Blind - Ground level, handicapped accessible	$1,000	$3,833
Subtotal	$5,500	$12,833
Administrative (5%)	$275	$642
Total Capital Cost	*$5,775*	*$13,475*

Source: Based on information from Nebraska Game and Parks Commission obtained via telephone, Kearney, Nebraska.

Total costs and one-time benefits associated with the hunting and bird watching facilities are provided in Table 7.5-2. Given the number of blinds projected to be built in the Program management areas, the Program's cost to construct the blinds and related facilities is estimated to be $131,000 under Scenario 1, $190,600 under Scenario 2 and $28,900 under Scenario 3. If the blinds are constructed by businesses located in the study area, additional sales, income and employment will be generated within the study area. It was assumed that all funds used to develop blinds would come from government sources outside the study area and would be an inflow of money spent in the area. This would be a one-time benefit that would occur at the time that the blinds are constructed. For example, total sales in the study area during the period 2003 to 2006 would increase by $198,900 under Scenario 1, $289,300 under Scenario 2 and $43,900 under Scenario 3. During this same period, total income would increase by $86,500 under Scenario 1, $125,900 under Scenario 2 and $19,100 under Scenario 3. This income would accrue to local business owners and their employees - 2.7 employees under Scenario 1, 3.9 employees under Scenario 2 and 0.6 employees under Scenario 3. Indirect business taxes would increase by about $5,600 under Scenario 1, $8,100 under Scenario 2 and $1,200 under Scenario 3.

Another cost item reported in Table 7.5-2 is the annualized capital cost of the blind facilities under each scenario. This cost is the capital cost annualized over ten years at 2.8 percent discount rate. Ten years is the approximate useful life of a blind. Under Scenario 1, the annualized capital cost is $15,200 per year. This is the annual payment needed to pay off an $131,000 loan over ten years at 2.8 percent real interest. Under Scenario 2, the annualized cost is $22,100 per year and $3,400 per year under Scenario 3. The annualized capital cost is

considerably lower than the annual total income generated from the increased hunting and bird watching days (see Tables 7.1-2b, 7.1-3b and 7.1-4b).

As a result, it appears that providing additional hunting and bird watching blinds in the Program management areas provides positive net economic benefits[4].

[4] *Additional cost information that should be considered includes any annual management costs that would be incurred due to the existence of the blinds, such as site clean-up and insurance costs.*

Table 7.5-2
Program Cost and One-Time Local Benefit From Constructing Hunting and Bird Watching Blinds Under Program Scenarios 1 and 2[A]

Item	Number of Blinds	Cost to Program	One-Time Benefit of Construction Activity to Study Area Economy			
			Total Sales	Total Income	Total Employment	Total Indirect Business Taxes
Scenario 1						
Hunting	18	$104,000	$157,900	$68,700	2.1	$4,400
Bird Watching	2	$27,000	$41,000	$17,800	0.6	$1,200
Total	*20*	*$131,000*	*$198,900*	*$86,500*	*2.7*	*$5,600*
Annualized Cost (10 years at 2.8% discount rate)		$15,200				
Scenario 2						
Hunting	26	$150,200	$228,000	$99,200	3.1	$6,400
Bird Watching	3	$40,400	$61,300	$26,700	0.8	$1,700
Total	*29*	*$190,600*	*$289,300*	*$125,900*	*3.9*	*$8,100*
Annualized Cost (10 years at 2.8% discount rate)		$22,100				
Scenario 3						
Hunting	5	$28,900	$43,900	$19,100	0.6	$1,200
Bird Watching	0	$0	$0	$0	0.0	$0
Total	*5*	*$28,900*	*$43,900*	*$19,100*	*0.6*	*$1,200*
Annualized Cost (10 years at 2.8% discount rate)		$3,400				
Multiplier (direct, indirect and induced)			1.52	0.66	20.38	0.04

[A] *All Costs and benefits greater than $1,500 have been rounded to nearest 1,000 dollars. All costs and benefits are in 1998 dollars.*

8.0 Fiscal Impacts

In addition to generating economic activity, private land use is important to the tax base of local government subdivisions. This is especially true in Nebraska because a significant percentage of local tax revenues are generated through property taxes. At this time the Governance Committee has agreed to pay all property taxes on acquired habitat lands as long as the Program is in place as stated in the following policy statement released on February 9,1999.[1]

> The Program shall pay on an annual basis to the county in which land is acquired in fee title by or on behalf of the Program, the property taxes or an amount equivalent to the property taxes. Such taxes shall be those assessed by the county for similar land classifications. In the case of the property being held in tax-exempt status, the tax equivalent to be paid shall be based upon the then current assessment for the classification of the land that the property had at the time it was acquired.

Given this policy statement by the Governance Committee, it is not expected that the Program would negatively impact the property tax revenues to local government subdivisions. However, if the Program changed this policy and did not pay taxes on large blocks of program lands that are acquired through fee simple title, there is a potential for negative tax revenue impacts in local areas. This is a significant concern for small, rural school districts that rely heavily on property taxes for funding.

While the Program is not expected to decrease property tax revenues from program lands, there is a potential for changing land uses or classifications to impact tax revenues. Under current Nebraska tax laws, agricultural land is taxed at 80 percent of market value while other land classifications are taxed at 100 percent of market value. Local county tax assessors were interviewed to gain an understanding of how program lands would be taxed if converted from agricultural production to wildlife habitat. From the interviews it was found that there is no consensus regarding how program lands would be taxed. This is due to the following issues.

- Protected areas will still have agricultural land uses including grazing and hay production in actively managed areas as well as row crops and grazing in buffer areas. Therefore, these areas may maintain their agricultural status for tax purposes and tax revenues would not be expected to change under the Program.

- The market value for accretion lands along the Platte River has increased in many local areas within the study area due to the demand for sites for second homes and recreational purposes (e.g. hunting). The State of Nebraska is interested in changing the tax classifications for these areas. Under this scenario, property tax revenues from Program lands may increase with a change in tax classification for accretion areas. This is especially true if the Program allows increased recreational use on protected habitat.

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1 *Governance Committee, Proposed Platte River Recovery Implementation Program, February 9, 1999.*

Changes in land use caused by the Program can also potentially impact sales and excise taxes collected by government subdivisions in the central Platte Region. In Section 5.0, 6.0 and 7.0, the change in indirect business taxes caused by a change in land use under each of the Habitat Scenarios was reported. Indirect business taxes include sales and excises taxes that consumers pay to businesses as they purchase goods and services. The change in indirect business taxes was estimated by applying economic multipliers to the change in direct sales resulting from a change in land use. The change in indirect business taxes under all Scenarios are summarized in Table 8.1-1.

Table 8.1-1
Estimated Changes in Indirect Business Taxes Resulting From Habitat Protection

	Present Value - 2001 to 2020 at 2.8% Discount Rate		
	Scenario 1	**Scenario 2**	**Scenario 3**
Reduced Agriculture Production	-$276,000	-$326,000	-$46,000
Habitat Restoration and Management	$452,000	$382,000	$575,000
Increased Recreation Expenditures in Study Area	$228,000	$323,000	$38,000

The results of this analysis indicate that indirect business taxes would fall with a reduction in agricultural sales from program lands. However, tax receipts are estimated to increase due to sales increases caused by habitat restoration and management activities and increased recreational expenditures.

9.0 Environmental and Social Impacts of Land Use Changes from Agriculture to Protected Habitat

This section describes the impacts of the proposed Program on neighboring lands; water quality and quantity; and educational/research opportunities.

9.1 Impacts to Neighboring Properties

To identify potential impacts of the Program to neighboring property owners, owners of local areas providing habitat protection, their neighbors, and Weed Control District superintendents were interviewed. Interviews were completed for five habitat owners; five adjacent property owners; and seven Weed District superintendents. The habitat owners manage property along the Platte River in the study area and include the following entities.

- Central Nebraska Public Power and Irrigation District
- The Platte River Whooping Crane Maintenance Trust
- The Nature Conservancy
- Nebraska Public Power District
- The National Audubon Society

Three of the neighboring property owners are adjacent to the Rowe Sanctuary, owned by the National Audubon Society. One respondent's land is adjacent to habitat-protected property owned by the Central Nebraska Public Power and Irrigation District. The other respondent's land is adjacent to land owned by the Nebraska Public Power District. All five are farmers whose land uses include one or more of the following: pasture, corn and soybeans.

From these interviews, the following impacts were identified.

Potential Negative Impacts to Adjacent Property Owners. All of the five adjacent landowners said that the habitat-protected land adjacent to their property has not caused the following problems.

- Increased trespassing
- Increased mosquito or rodent populations
- Property damage from wildlife
- Unacceptable access to property

Four of the five respondents said that there have been no weed infestations caused by management of the habitat-protected property. One of the respondents said that the tree clearing and ground cultivation on the habitat-protected property has increased the musk thistle

population on his property. He has not taken any action to control this infestation but says that he will if the problem gets any worse.

One of the respondents, a farmer, said that the widening of the river for habitat management has caused flooding on some of his property. As a result, he has had to move his fences.

The owners of the habitat-protected properties said that impacts to neighboring properties are negligible. However, the Nature Conservancy[1] observed that initial outbreaks of noxious weeds might occur due to initial tillage and fence construction during management conversion. Habitat protection managers indicated that in such instances, within the third to fifth year, there would be no visible impacts of noxious weed infestation.

According to the Weed Control District Superintendents[2], it is the property owner's legal responsibility to treat all noxious weed outbreaks. Therefore, in the event that an infestation occurred that was clearly caused by management of the protected habitat, then the habitat owner would be responsible for the cost of control. Otherwise, the neighboring property owner would be responsible for the cost of control. Based on information provided by the Weed Control District Superintendents, the cost to treat weed-infested areas during the three to five year control period will vary with the intensity of the infestation. For a severe infestation, an order of magnitude cost would be about $500 per acre during the treatment period.

One respondent indicated that, over the years, there has been an increase in the number of birdwatchers due to the increased crane population. Another farmer indicated that he plans to install fences and no-trespassing signs due to the greater number of bird watchers in recent years. This farmer remarked that "the installation cost of $1,500 for fences, gates and signs was a small price to pay to ensure additional wildlife variety right next door." Overall, neighboring property owners say that the bird watchers are tolerable. However, four of the neighbors interviewed stated that wild game poachers and joy riders are a problem and their numbers would increase proportionally with an increase in the number of birdwatchers.

While adjacent landowners did not indicate that trespassing is a problem on lands located next to currently protected habitat, it is worth noting the policies implemented by habitat managers concerning public access. For all of the private habitat areas in the study area, there is either no public access or it is strictly controlled. As a result, adjacent landowners have not experienced an increase in trespass related problems. If the Program chooses to increase public access to protected habitat areas it is likely that this activity will need to be controlled to avoid problems associated with illegal trespass.

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1 *Brent Lathrop, The Nature Conservancy. Aurora, Nebraska. Personal Communication: October 14, 1999.*

2 *Jim Rhinehart, Weed District Superintendent – Gosper County, Nebraska. Personal Communication: October 15, 1999 and Rob Schultz, Weed District Superintendent – Hall County, Nebraska. Personal Communication: October 19, 1999.*

Potential Positive Impacts to Adjacent Property Owners. The five neighbors interviewed identified the following positive impacts they received from the habitat-protected property.

- Neighbors enjoy gazing at scenic rangeland – no development
- Aggressive trespasser control of managed property
- Neighbors who are hunters enjoy the additional wildlife
- Potential to receive new fences paid by habitat owner
- Ability of neighbors to observe new cultural practices on the habitat-protected land

One farmer remarked that he was particularly pleased that one habitat manager erected fences as a standard procedure significantly reducing the farmer's boundary maintenance cost. Other farmers were pleased to have habitat-protected property next door because the habitat managers increased the level of monitoring and security in the area.

Overall, the neighbors believe that habitat management helps to control urban development. A few of the neighbors also commented that the land uses were being preserved and that was considered to be a positive impact. Habitat managers were maintaining most of the previous uses. However, one neighbor remarked that the habitat manager had planned to introduce improved rotation, a technology which could be shared and that would help reduce weed infestation. Another neighbor was particularly excited about the potential for grazing buffalo on these large expanses, instead of cattle, because buffalo meat fetches a 300 percent higher price and are hardier animals to the weather.

9.2 Water Quality and Quantity

Converting land from agricultural production to wildlife habitat has the potential to change the quality of water in the natural watercourse and the quantity of water consumed by the plant life. This subsection describes the issues regarding potential impacts to water quality and quantity from the proposed Program.

Impact of Land Use Change on Water Quality. Under Scenario 1, about 2,497 acres of alfalfa, corn, row crops and pasture would be converted to wildlife habitat. Under Scenario 2 and Scenario 3, about 2,314 and 2,033 acres, respectively of these agricultural lands would be converted to habitat. Water quality experts from the Central Platte and Tri-Basin Natural Resources Districts were interviewed to determine the types and magnitudes of water quality benefits and detriments that would be expected from this land use conversion[3]. The 23 Nebraska Natural Resources Districts carry out the mission of the Nebraska Natural Resources

[3] *Ronald Bishop, Manager, Central Platte Natural Resources District, Grand Island, Nebraska and John Thorburn, Manager, Tri-Basin Natural Resources District, Holdrege, Nebraska, telephone interviews, October 29, 1999. These districts are located north and south of the Platte River, respectively, in the study area.*

Commission which is to provide long-range planning, management and proper utilization of Nebraska's land and water resources.

Potential water quality benefits from this land use conversion include reduced soil erosion, reduced river sedimentation, and reduced nitrate and phosphorus loadings to the Platte River. However, the amount of land that would be converted from crop production to wildlife habitat is not large enough to expect significant positive changes in water quality. However, no detrimental water quality impacts are expected.

Impact of Land Use Change on Freshwater Use and Allocation. Under Scenario 1, about 2,497 acres of alfalfa, corn, row crops and pasture would be converted to wildlife habitat. Under Scenario 2 and Scenario 3, about 2,643 acres and 2,033 acres respectively, of these agricultural lands would be converted to habitat. The impact of this conversion on freshwater use and allocation depends on several factors[4].

The change in water use from the land use conversion is the difference between the amount of water used by the crop less the amount used by the plant community that comprises the new wildlife habitat. If water use is lower after the land converts to wildlife habitat, then this reduction would be comprised of the amount that would have been taken from the river or from under ground and the amount that would have entered the groundwater and/or river from percolation (due to rainfall).

The next factor is the water source used to irrigate the crop. If the irrigation water is taken from underground, then this water would remain in the aquifer, percolate into the river, or be used by other nearby groundwater users[5]. If the irrigation water is taken from the river and is not used to irrigate the wildlife habitat, then the landowner could transfer the water allocation to another agricultural landowner.

If the water allocation is not transferred then the fate of the water each year will depend on whether or not there is a water shortage that year. If there is no water shortage, then the water would remain in the Platte River system or be stored behind a dam. During years of water shortage, the water would be used by another appropriator such as an agricultural operation, a municipality or an industrial operation.

In any case, the conversion of agricultural land into wildlife habitat would provide benefits to the community as long as there is a net savings in water use from the conversion. If there is a net increase in water use from conversion and this water is taken from the Platte River either directly

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[4] *Information regarding impacts on water quantity based on an interview with Mr. Jim Cook, Legal Counsel, Nebraska Natural Resources Commission, Lincoln, Nebraska, October 28, 1999.*

[5] *Groundwater pumping requires a well drilling permit but not a water use permit. The water user may pump groundwater for use on his/her land only. Groundwater transfers to uses beyond the land from which the water is pumped must be approved by the State legislature.*

or through reduced percolation, then less water would be available from the river for economic uses, such as agriculture, municipal and industrial operations.

9.3 Educational and Research Opportunities

The extent and value of educational and research opportunities for habitat-protected areas depends on the management policies of the owners and the degree to which the land can be easily accessed. Some local habitat-protected properties offer access to educational groups, ranging from grade school to graduate school. Some owners encourage research with universities, scouting camps and hunting-mentoring programs.

Some owners provide a variety of education programs and look for expansion opportunities; while other owners offer limited programs and seek limited expansion opportunities. Some owners have aggressively pursued visitors while others are passive. In one instance, the owner allows educational visits, but access problems keep visitors away. These access problems include having to "wade" across streams to access the property. There are also concerns of accident liability, which could increase habitat management costs.

9.4 Change in Public Expenditures for Entitlement Programs

A land use change has the potential to reduce employment and income to individuals and businesses that provide products and services to directly affected industries. The change in employment due to the Program was estimated in Section 5.0, 6.0 and 7.0. While the overall impact to employment is expected to be positive, it was estimated that the agricultural sector would experience a slight decrease in employment (-2 to –6 jobs) due to a reduction in agricultural sales on Program lands. It is not expected that the decrease in agricultural employment due to the Program would cause a significant impact on expenditures for entitlement programs. Because Nebraska is operating close to full employment, it is likely that another firm, needing similar skills would rehire a displaced agricultural worker affected by the Program. Therefore, expenditures on entitlement programs are not expected to increase due to the Program.

10.0 Identification and Evaluation of Potential Methods to Eliminate or Mitigate Adverse Third Party Impacts

The objective of Goal 2 of the Third Party Impact Study was to identify and evaluate potential methods to eliminate or mitigate adverse third party impacts related to the Program. The potential negative impacts of the Program were addressed in earlier sections of this report and are summarized as follows.

- Potential negative economic impacts to the agricultural sector in the Central Platte Region due to a land use change from agricultural production to protected wildlife habitat.

- Potential negative impacts to adjacent landowners

Hazen and Sawyer has reviewed these potential impacts with members of the Third Party Impact Subcommittee. Considering the potential negative impacts, Hazen and Sawyer and the committee suggests the following mitigation strategies.

- If possible avoid the conversion of high-valued row crop areas such as corn and soybeans to wildlife habitat.

- Maximize the use of agricultural best management practices (BMPs) and local land use practices that are compatible with habitat restoration goals to avoid losses in crop and livestock production.

- Maximize the local and regional economic impacts from habitat restoration and management by hiring local contractors to perform restoration and management activities.

- Increase recreational opportunities on potential habitat lands through limited public access.

- Provide necessary resources to manage recreational activities during bird watching season (5 weeks in early spring) and hunting season (October through January).

- Conduct operations in a manner consistent with local laws and ordinances that protect adjacent landowners and demonstrate a "good neighbor" attitude towards solving potential problems with adjacent landowners (e.g. weed control, fencing, and other nuisance factors).

These mitigation strategies are the focus of this section and are discussed in detail below.

10.1 Mitigation Strategies for Negative Economic Impacts

The potential economic impacts of the Program were investigated in Section 5.0, 6.0 and 7.0 of this report. Economic impacts of the proposed Program can occur as employment and income to households and business are affected by the change in land use on 10,000 acres in the central Platte Region. While the Program is expected to generate overall positive economic impacts for the regional economy, it was estimated that negative economic impacts could occur to the agricultural sector with a land use change from agriculture to wildlife habitat. This is due to the reduction in sales from agricultural products on potential Program lands. To avoid these negative economic impacts to the agricultural sector, the following strategies are suggested.

- Where possible, the Program should avoid converting high-valued row crop areas such as corn and soybeans to wildlife habitat.

- Use agricultural best management practices (BMPs) and local land use practices that are compatible with habitat restoration goals and minimize losses in crop and livestock production.

10.1.1 Avoid Conversion of High-Valued Crops

To avoid negative economic impacts to the agriculture sector, the Program should try and avoid, where possible, the conversion of lands that are now producing high-valued crops such as corn and soybeans to wildlife habitat. This strategy is demonstrated in the Habitat Protection Scenarios. Table 5.4-1 and 5.4-2 summarizes the total acreage by land use that will be converted to wildlife habitat under Scenario 1, Scenario 2 and Scenario 3.

Under Scenario 1, approximately 2,497 total acres of alfalfa, corn, soybeans and grazing would be converted under the Program to habitat while approximately 2,643 total acres would be converted under Scenario 2. Under Scenario 3, approximately 2033 acres would be converted from agricultural production to habitat. From these two tables, it is apparent that Scenario 1 and Scenario 2 will convert approximately 400 to 600 more acres of agricultural production to habitat than under Scenario 3. The results of the economic analysis indicated that Scenario 3 is expected to have lower negative impacts to sales, income and employment to the agricultural sector than either Scenario 1 or Scenario 2. This is due in part to less acreage being converted from agricultural use to habitat under Scenario 3. However, Scenario 3 would also impact less high-valued crop acreage than the other two Scenarios. Because high-valued crops, such as soybeans and corn, generate more direct sales in the regional economy, conversion of these areas to habitat will cause larger negative impacts than converting alfalfa and grazing areas. Therefore, the negative impacts under Scenario 3 are not only smaller because less acreage is being converted but more importantly because less high-valued crop areas are being impacted. Program managers should consider this implication when identifying potential habitat areas.

10.1.2 Utilize Agricultural Best Management Practices on Critical Habitat Areas

The Program may be able utilize a set of agricultural BMPs in critical habitat areas that will satisfy the established goals for habitat protection while minimizing the losses to crop and

livestock production. For purposes of the evaluating economic impacts, it was assumed that the following habitat types would be restored and protected over the study period.

- Main Channel Habitat – a mixture of wetted channel, sandbars and islands;
- Riverine Buffer – combination of cover types (e.g. main channel habitat, riparian forest and grasslands)
- Wet meadows – seasonally wet grasslands
- Wet meadow buffers – grasslands and/or croplands.

Each of these habitat areas will be managed for the purpose of endangered species. The wildlife habitat management strategies that have been identified to date are summarized in Table 10.2-1.

Table 10.2-1
Proposed Management of Habitat Areas[a]

Habitat Type	Proposed Management
Wet Meadows and Upland Grasslands	Management would include a rotational strategy of haying and/or grazing, burning and resting
Main Channel Habitat	Maintain cleared areas through mowing or shredding, discing, burning, and/ or chemical application for desired conditions (e.g. no or low vegetation such as grasses).
Riverine Buffers	Current land uses will be maintained as long as they are compatible with habitat protection goals
Wet Meadow Buffers	Current land uses will be maintained as long as they are compatible with habitat protection goals

a U.S. Fish and Wildlife Service, Draft – Habitat Options, Denver, Colorado, September 1999.

It is suggested that the Program maximize the use of agricultural BMPs that would allow farmers to use critical habitat acreage during certain times of the year when the areas are not being utilized by targeted species. For example, the management of wet meadow and upland grassland areas with rotational grazing and haying can service dual purposes including the following.

- Management of wet meadows and upland grasslands using a varied rotation of grazing, haying and burning can improve and maintain a diversity of tall and short

native grasses and forbs for targeted species and livestock.[1] Additionally, as habitat areas are established, grazing and hay production rates may actually increase with a rotational grazing scheme.[2]

- Using a rotational scheme allows program managers to maximize the potential multiple uses of critical habitat areas. For instance under a rotational scheme, livestock would be removed when the target species are present in critical habitat areas and allowed to graze when target species are not using the habitat areas.

The economic analysis assumed that rotational grazing and hay production would be allowed on wet meadows and grassland areas. This includes areas that were previously not used for agricultural production such as riparian forest areas that would be cleared and restored as wet meadows. It is suggested that the Program use these types of management schemes that integrate traditional modified agricultural practices that are compatible with management of habitat for targeted species. The management scheme will help to maintain agriculture production on Program lands and minimize negative impacts to the agricultural sector in the study area.

It is expected that the Program would have an initial one-time cost to prepare possible wet meadow and grassland areas for livestock use. This will most likely include expenditures on fencing required to support a rotational grazing scheme. While some potential program lands are presently being used for grazing and would have fenced pastures available many other areas would require additional fencing. This is especially true for riverine land cover areas that would be converted to wet meadows and grasslands (e.g. riparian forest and shrubs). For these areas, grazing is not a common practice because of the difficulty and cost of fencing near main channel areas.[3] Additionally, currently grazed pastures may not have adequate fencing to support a rotational grazing scheme. Therefore additional fencing may be needed.

In order to maximize the use of grazing as a management scheme, the Program should expect an initial investment for fencing. This includes habitat protection on Program lands that are left in private ownership. While the Program may be able to negotiate the cost of fencing with private landowners and lessees, it is expected that significant fencing costs would need to be paid by the Program in order to make grazing economical on potential habitat areas.

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1 *West Inc.*, Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes, *prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, September, 1999, Cheyenne, Wyoming.*

2 *Bob Scrivens, Agricultural Extension Agent, University of Nebraska Agricultural Extension, Kearney, Nebraska.*

3 *Bob Scrivens, Nebraska Agricultural Extension Agent, University of Nebraska Agricultural Extension, Kearney, Nebraska.*

10.2 Mitigation Strategies to Maximize Positive Economic Impacts of Habitat Restoration and Recreation

While the focus of this section is on mitigation strategies to reduce or eliminate negative third party impacts, issues related to maximizing the potential positive economic impacts from protecting habitat in the central Platte Region are addressed here. This includes the following.

- Maximize the economic impacts to the study area economy from habitat restoration and management by hiring local firms to complete restoration and management activities.

- Increasing recreational opportunities through public access of potential habitat lands.

10.2.1 Positive Economic Impacts of Habitat Restoration and Management

Restoration and management of habitat lands was estimated to provide positive economic benefits to the study area with an increase in direct, indirect and induced sales, employment and income as summarized in Table 6.1-2 through 6.1-7. These impacts are the result of increased spending on habitat restoration and management. The present value cost of restoration and management under Scenario 1, Scenario 2 and Scenario 3 was estimated to be $4.96 million, $3.5 million, and $6.3 million respectively over the study period.

To maximize the positive economic impacts of restoration and management of habitat lands, the Program should try and utilize, as much as possible, local contractors for restoration and management activities. By using local contractors, who utilize local labor, there is a better chance that increases in spending will occur in the study area economy. This should not create a significant hardship for the Program given the level of expertise related to habitat restoration that has been acquired by local firms. This experience has been gained through the activities of the FWS to restore habitat lands along the Platte River.[4]

10.3 Increase Recreational Opportunities

The restoration and management of additional acreage for wildlife habitat has the potential to increase the number of areas that are open for limited recreational opportunities. The economic impact of increasing recreational opportunities and expenditures in the area was estimated to provide a positive economic impact as reported in Section 7.0. While the purpose of the habitat protection program is to protect endangered species, including the whooping crane, the piping plover and the least tern, the habitat restoration areas have the potential to provide valuable hunting and bird watching opportunities along the Platte River. This includes waterfowl hunting and bird watching along the Central Platte River, which are very popular recreation activities in this area. While these activities are very popular in this area, there are limited areas and opportunities for the general public to enjoy this type of recreation. Therefore, increasing

[4] *Kenny Dinan, Private Lands Coordinator, U.S. Fish and Wildlife Service, Grand Island, Nebraska. Personal communication: September 15, 1999.*

hunting and bird watching opportunities can potentially provide valuable benefits to the study area.

While the increase in recreational activities can potentially provide positive economic benefits to the regional economy, the increase in the recreation can also cause negative impacts to local and adjacent landowners. This includes problems such as trespassing, increased litter, traffic congestion, increased grass fires and other safety concerns. If recreation is allowed on habitat lands, then additional resources should be provided that will help manage potential nuisance problems associated with increased recreation activities.

The key to maximizing the positive economic impacts from increased recreational opportunities includes the following.

- The Program provides limited public access to habitat areas for bird watching and hunting;
- The Program provides necessary resources to maintain and manage site facilities that will support additional recreational opportunities (e.g. hunting and bird watching blinds, bathroom facilities, parking areas, increased security, emergency support services, etc.) during bird watching season (5 weeks in early spring) and hunting season (October through January).

10.4 Potential Impacts to Adjacent Land Owners

The potential impacts of the Program to neighboring property owners were investigated in Section 9.0. To date the potential negative impacts identified include the following.

- Restoration and management of habitat lands could potentially increase the spread of noxious weeds to habitat areas and adjoining properties
- Increasing recreational opportunities could increase the occurrence and magnitude of nuisance problems such as trespassing, litter, traffic, fire protection, etc.
- Habitat restoration and management may cause flooding on adjacent properties
- Habitat restoration and management may increase pest and wildlife impact occurrences on adjacent properties.

Further discussion with the Third Party Impact Subcommittee indicated that many of these nuisance problems can be avoided through cooperation with adjacent landowners. Specifically the committee suggested drafting a mitigation strategy to address these problems as follows.

- Conduct operations in a manner consistent with local laws and ordinances that protect adjacent landowners and demonstrate a "good neighbor" attitude towards

solving potential problems with adjacent landowners (e.g. weed control, fencing, and other nuisance factors).

In many cases, Nebraska State Law addresses nuisance factors regarding land use practices and adjacent properties. This includes such things as noxious weeds and fencing. The Program manager will be required to meet the requirements of these and other relevant statutes. In addition, the Program manager can promote a "good neighbor" policy that will insure that nuisance problems with adjacent landowners are addressed in a timely, reasonable manner.

APPENDIX A

LAND USE CONVERSIONS FOR THE HABITAT PROTECTION SCENARIOS

Table A.1-1
Land Management Plan Summary[1]
Scenario 1 – Habitat Block A
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1998 Vegetation Description	Total Acreage	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC	Wetted Channel	482	Wetted Channel	9.8	Wetland Rehabilitation
	BB	Barren Beach	22	Barren Beach	0.4	Wetland Rehabilitation
	HI	Herbaceous on Island	32.5	Herbaceous on Island	9.3	Bare Sand
					0.4	Wetland Rehabilitation
	EM	Emergents	0.41	Emergents		
	SH	Shrubs inside Floodplain	15.3	Shrubs inside Floodplain	102.3	Bare Sand
		Wet Meadow Mosaic	1146	Wet Meadow Mosaic		
	SI	Shrubs on Island	162	Shrubs on Island	6	Wetland Rehabilitation
	HE/H	Herbaceous; also known as "wet meadows"	29	Season-long Grazing	9.5	Wetland Rehabilitation
					19.5	Wet Meadow
	WI	Woody on Island	88	Woody on Island		
Agriculture	AL	Alfalfa	5.3	Alfalfa		
	CO	Corn	448	Corn		
	MWM	Mown Wet Meadow	311.3	Mown Wet Meadow	274.1	Wet Meadow
	OC	Other Crops	84.4	Crops		
	GR	Grassland	97.9	Season-long grazing		
Development	GA	Gravel Road	19.8	Gravel Road		
	PA	Paved Road	0.17	Paved Road		
	PR	Private Road	3.7	Private Road		
	SD	Single Dwelling	38.7	Single Dwelling		
	SG	Sand/Gravel Operation	5.9	Abandoned Sand & Gravel		
	UD	Urban Development	32.9	Urban Development		
Other	OW	Open Water Lake/Pit	18	Open Water Lake/Pit	0.4	Wetland Rehabilitation
	WO	Woody	753	Woody	604.3	Wet Meadows
					49	Bare Sand
	WR	Wooded			14	Wetland Rehabilitation
	WS	Woods/Shrubs		Woods/Shrubs		
Total Managed Habitat Acreage			***3,796***		***1,099***	

1 The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.

Table A.1-2
Land Management Plan Summary[1]
Scenario 1 - Habitat Block B
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1998 Vegetation Description	Total Acreage	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC	Channel	316.2	Channel		
	BB	Beach/Bar	76.1	Beach/Bar		
	HI	Herbaceous on Island	21.6	Herbaceous on Island		
	SH	Shrubs inside Floodplain	85.9	Shrubs inside Floodplain	89.6	Wet Meadow
	SI	Shrubs on Island	216.3	Shrubs on Island	102.3	Bare Sand
	EM	Emergents	16.9	Emergents		
		Wet Meadow Mosaic	6.4	Wet Meadow Mosaic		
	HE	Herbaceous; also known as "wet meadows"	88	Grazing		
	WI	Woody on Island	700	Woody on Island	102.5	Native Grasses
					48.9	Bare Sand
					28.3	Wet Meadow
Agriculture	AL	Alfalfa	57	Alfalfa	4.2	Native Grasses
	CO	Corn	1090	Corn	103.9	Native Grasses
	OC	Other Crops	94.2	Crops	72.6	Native Grasses
	MMW	Mown Field	46.8	Mown Field		
	GR	Grassland	65.56	Grazing		
Development	GA	Gravel Road	46.5	Gravel Road		
	PA	Paved Road	139	Paved Road		
	PR	Private Road	0.08	Private Road		
	SD	Single Dwelling	24.6	Single Dwelling		
	SG	Sand/Gravel Operation	14.1	Abandoned Sand & Gravel	13.7	Managed Abandoned Sand and Gravel
		Barren Surface	2.4			
	UD	Urban Development	1.2	Urban Development		
Other	OW	Open Water	18.1	Open Water		
	WO	Woody Riparian	576	Woody Riparian	576	Wet Meadow
	WS	Woods/Shrubs	15.5	Woods/Shrubs		
Total Managed Habitat Acreage			***3,718***		***1,142***	

[1] *The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.*

Table A.2-1
Land Management Plan Summary[1]
Habitat Protection Scenario 2 - Segment A
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1998 Vegetation Description	Acreage by Land Cover Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC	Wetted Channel	466	Channel		
	BB	Barren Beach	4.5	Barren Beach		
	HI	Herbaceous on Island	3.1	Herbaceous on Island		
	SH	Shrubs inside Floodplain	44.6	Shrubs inside Floodplain	58.9	Wet Meadow
		Shrubs outside Floodplain	0.5			
	EM	Emergents	0.96			
	SI	Shrubs on Island	184.5	Shrubs on Island	105.9	Bare Sand
	HE	Herbaceous; also known as "wet meadows"	36.7	Grazing	19.5	Wet Meadow
	WI	Woody on Island	186.8	Woody on Island		
Agriculture	AL	Alfalfa		Alfalfa		
	CO	Corn	49.8	Corn		
	OC	Other Crops	73.7	Crops		
		Bare Ground	9.7			
		Upland Grasses	385	Grazing		
	MWM	Mown Wet Meadow	180.4	Grazing	171.7	Wet Meadow
Development	GA	Gravel Road	8.42	Gravel Road		
	PA	Paved Road		Paved Road		
	PR	Private Road		Private Road		
	SD	Single Dwelling	17.4	Single Dwelling		
	SG	Sand/Gravel Operation		Abandoned Sand & Gravel		
	UD	Urban Development	5.2	Urban Development		
Other	OW	Open Water	13.9	Open Water		
	WO	Woody	374.3	Woody	350.9	Wet Meadow
					25.5	Bare Sand
		Wet Meadow Mosaic	567.3			
	WS	Woods/Shrubs		Woods/Shrubs		
Total Managed Habitat Acreage			**2,613**		***732.4***	

[1] *The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.*

Table A.2-2
Land Management Plan Summary[1]
Scenario 2 - Segment B
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1982 Vegetation Description	Acreage by Land Cover Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC	Wetted Channel	332	Channel		
	BB	Beach/Bar	17.7	Beach/Bar		
	HI	Herbaceous on Island		Herbaceous on Island		
	SH	Shrubs inside Floodplain	120.4	Shrubs inside Floodplain		
	SI	Shrubs on Island		Shrubs on Island		
	HI	Herbaceous on Island	33.4			
	HE	Herbaceous; also known as "wet meadows"	22	Grazing		
		Wet Meadow Mosaic	729			
	WI	Woody on Island		Woody on Island		
Agriculture	AL	Alfalfa	10	Alfalfa		
	CO	Corn	176.6	Corn		
	OC	Other Crops	25.02	Crops		
	MWM	Mown Meadow	268	Hay Production	206.5	Wet Meadow
Development	CD	Commercial Development	0.44	Commercial Development		
	GA	Gravel Road	7.4	Gravel Road		
	PA	Paved Road	2.84	Paved Road		
	PR	Private Road		Private Road		
	SD	Single Dwelling	14.8	Single Dwelling		
	SG	Sand/Gravel Operation	1.6	Abandoned Sand & Gravel		
	UD	Urban Development	0.92	Urban Development		
Other	OW	Open Water	4.8	Open Water		
		Upland Grasses	149			
	WO	Woody	702	Woody	306.9	Wet Meadow
					86.9	Native Grasses
	WS	Woods/Shrubs		Woods/Shrubs		
Total Managed Habitat Acreage			**2,618**		***600.3***	

[1] *The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.*

Table A.2-3
Land Management Plan Summary[1]
Scenario 2 - Segment C
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1998 Vegetation Description	Acreage by Land Cover Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC	Wetted Channel	220.4	Channel		
	BB	Beach/Bar	52.5	Beach/Bar		
	HI	Herbaceous on Island	12.4	Herbaceous on Island		
	EM	Emergents	10.7			
	SH	Shrubs inside Floodplain	83.3	Shrubs inside Floodplain	47.1	Wet Meadow
					16.3	Bare Sand
	SI	Shrubs on Island	150.2	Shrubs on Island		
	HI	Herbaceous on Island	12.4	Herbaceous on Island		
	HE	Herbaceous; also known as "wet meadows"	72.1	Grazing		
	WI	Woody on Island	372	Woody on Island	205.1	Wet Meadow
					12	Bare Sand
Agriculture	AL	Alfalfa	17.5	Alfalfa		
		Bare Ground	3	Bare Ground		
	SB	Soy Beans	85.5	Soy Beans	52.9	Native Grasses
	CO	Corn	766	Corn	105.3	Native Grasses
	OC	Other Crops	34	Crops	13.5	Native Grasses
	MF	Mown Field	61.4	Hay Production	61.4	Native Grasses
Development	CD	Commercial Development		Commercial Development		
	GA	Gravel Road	39.1	Gravel Road		
	PA	Paved Road	7.7	Paved Road		
	PR	Private Road	0.6	Private Road		
	SD	Single Dwelling	16.3	Single Dwelling		
	SG	Sand/Gravel Operation	14.14	Abandoned Sand & Gravel		
		Barren Surface	0.1	Barren Surface		
Other	OW	Open Water	16.8	Open Water		
		Upland Grasses	26.4	Upland Grasses		
	WO	Woody Riparian	495.8	Woody Riparian	76.1	Wet Meadow
	WS	Woods/Shrubs	0.07	Woods/Shrubs		
Total Managed Habitat Acreage			**2,570**		*589.7*	

[1] *The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.*

Table A.3-1
Land Management Plan Summary[1]
Habitat Protection Scenario 3 – Summary
Platte River Recovery Implementation Program

Land Cover Type	Land Classification Code	1998 Vegetation Description	Acres	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
Riverine	WC, EM	Wetted Channel and Emergents	1169.33	Channel	7.9	Wetland Rehabilitation
					53	Bare Sand
	BB	Barren Beach	123.92	Barren Beach	3.9	Wetland Rehabilitation
	HI	Herbaceous on Island	70.24	Herbaceous on Island	0.8	Wetland Rehabilitation
	SH	Shrubs inside Floodplain	298.95	Shrubs inside Floodplain	0.2	Wetland Rehabilitation
					33.7	Bare Sand
					201.8	Wet Meadow
	SI	Shrubs on Island	267.56	Shrubs on Island	16.9	Wetland Rehabilitation
					122.6	Bare Sand
	HI	Herbaceous on Island	198.85		11.1	Bare Sand
		Wet Meadow Mosiac	1339.3		0	
		Herbaceous Riparian	272.34		0	
	WI	Woody on Island	856.36	Woody on Island	202	Bare Sand
					11	Wetland Rehabilitation
Agriculture	AL	Alfalfa	38.21	Alfalfa	20	Wet Meadow
	CO	Corn	469.71	Corn	0	
	OC	Other Crops	34.49	Crops	0	
	MWM	Mown Meadow	115.52		0	
		Agriculture Bare Ground	2.89		0	
	GR	Upland Grasses	173.24	Grazing	0	
Development		Bridge	0.47		0	
		Development Commercial	4		0	
		Development Residential	27.11		0	
		Barren Area	0.71		0	
		Road Interstate	23		0	
		Other Road	19.23		0	
	SG	Sand/Gravel Operation	85.95	Abandoned Sand & Gravel	35	Managed Abandoned Sand and Gravel
Other	WO	Woody inside Floodplain	1983.4	Woody inside Floodplain	1782.7	Wet Meadow
					131.4	Native Grasses
					14.6	Bare Sand
		Wooded Outside Floodplain	94.46		0	
		Open Water, pond or lake	150.36		0	
Total Managed Habitat Acreage			***7,820***		***2,649***	

[1] *The U.S. Fish & Wildlife used the 1998 land use cover GIS database developed by the U.S. Bureau of Reclamation to estimate acreage for this scenario as summarized in this table.*

Table A.4-1
Restoration Schedule of Cottonwood Ranch 2001-2006

Phase 1
Completion Year 2001

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
WO	Woody	Woody	63.2	Native Grasslands
WI	Woody on Island	Woody on Island	1.6	Bare Sand
BB	Beach/Bar	Beach/Bar	3.3	Bare Sand
SI	Shrubs on Island	Shrubs on Island	0.5	Bare Sand
HE	Herbaceous; also known as "wet meadows"	Herbaceous; also known as "wet meadows"	5.3	Wet Meadows
Total Acreage of Managed Habitat Areas for Phase 1				***73.9***

Phase 2
Completion Year 2002

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
AL	Alfalfa	Alfalfa	0	Native Grasslands
CO	Corn	Corn	233.4	Native Grasslands
EM	Emergents: Any emergent "wet grassland" vegetation	Emergents: Any emergent "wet grassland" vegetation	1.5	Wetland Rehabilitation
GA	Gravel Road		3	
SD	Single Dwelling		2.2	
GR	Grassland		92.8	Native Grasslands
HE	Herbaceous; also known as "wet meadows"	Herbaceous; also known as "wet meadows"	91	Wetland Rehabilitation
WO	Woody		9.6	Wet Meadows
SI	Shrubs in Floodplain		0.3	Wetland Rehabilitation
OC	Other Crops		124.8	Wet Meadows
Total Acreage of Managed Habitat Areas for Phase 2				***559***

Table A.4-1 (Cont.)
Restoration Schedule of Cottonwood Ranch 2001-2006

Phase 3
Completion Year 2003

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
WO	Woody	Woody	12	Native Grasslands
			4	Sloughs and Backwater areas
BB	Beach/Bar	Beach/Bar	27.3	Bare Sand
SI	Shrubs on Island	Shrubs on Island	16	Bare Sand
HE	Herbaceous; also known as "wet meadows"	Herbaceous; also known as "wet meadows"	45	Wet Meadows
WI	Woody on Island	Woody on Island	5.5	Bare Sand
Total Acreage of Managed Habitat Areas for Phase 3				***110***

Phase 4
Completion Year 2004

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
WO	Woody	Woody	77.3	Native Grasslands
			27	Sloughs and Backwater areas
HI	Herbaceous Island		20.8	Sloughs and Backwater areas
BB	Beach/Bar	Beach/Bar	1	Bare Sand
SH	Shrubs in Flood Plain	Shrubs in Flood Plain	2.4	Native Grasslands
CH	Channel	Channel	0.2	Channel
Total Acreage of Managed Habitat Areas for Phase 4				***128.7***

Table A.4-1 (Cont.)
Restoration Schedule of Cottonwood Ranch 2001-2006

Phase 5
Completion Year 2005

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
WO	Woody	Woody	62	Wet Meadows
			48	backwater or sloughs
BB	Beach/Bar	Beach/Bar	1.8	Bare Sand
SH	Shrubs in Flood Plain	Shrubs in Flood Plain	5	Native Grasslands
HI	Herbaceous on Island	Herbaceous on Island	5.6	Native Grasses
WC	Wetted Channel	Wetted Channel	14.6	Channel
Total Acreage of Managed Habitat Areas for Phase 5				***137***

Phase 6
Completion by 2006

Vegetation Code	Vegetation Type	Current Land Use	Acreage Impacted by Restoration Activities	Land Use Under Program
WO	Woody	Woody	80	Wet Meadows
			19	Backwater or sloughs
BB	Beach/Bar	Beach/Bar	11.8	Bare Sand
SI	Shrubs on Island	Shrubs on Island	11.5	Native Grasslands
HI	Herbaceous on Island	Herbaceous on Island	13.1	Native Grasslands
HE	Herbaceous; also known as "wet meadows"	Herbaceous; also known as "wet meadows"	17.1	Wet Meadows
WI	Woody on Island	Woody on Island	3.8	Native Grasslands
WC	Wetted Channel	Wetted Channel	13.1	Channel
Total Acreage of Managed Habitat Areas for Phase 6				***169***

APPENDIX B

GRAZING AND HAY PRODUCTION RATES ON PROGRAM LANDS

Calculation of Production Rates for Grazing and Hay on Program Lands

This appendix provides a detailed discussion of how the potential grazing and hay production rates on Program lands after restoration were calculated. The estimates were made using information in the West Report[1]. The results of this analysis are summarized in Table 5.2-11 on page 5-15.

It was assumed that wet meadows on Program lands would be managed as a three pasture system. In any one year, this system allows one pasture to be grazed early and late season, a second pasture to be grazed mid-season and the third pasture to be burned and rested. This grazing scheme is similar to the one used by The Nature Conservancy and the Platte River Whooping Crane Trust.[1] Table B-1 shows the number of months and production rates per season as well as the rational grazing scheme for the three-pasture system.

Table B-2 shows the calculation of the average AUM per pasture assuming this rotational scheme. Row 1 shows the production rate per acre while Row 2 shows the average number of acres per pasture. The total number of AUMs per pasture was calculated and summarized in Row 3. The sum of all AUMs for the pastures used in the rotation is 675. The total AUMs was then divided by the average number of acres used in the rotation to get a weighted average production rate of 1 AUM per acre in this rotational grazing scheme.

Table B-1
Potential Grazing Seasons for Rotational Grazing for Wet Meadows on Program Lands[a]

Grazing Season	Calendar Months	Number of Grazing Months
Early Season	Mid-April through Early July	2
Mid-Season	Early-July through Mid-August	1
Late Season	Mid-August through Mid-October	2

a *Estimated with information from Western Ecosystems Technology, Inc., "Draft Habitat Management Methods for Least Terns, Piping Plovers and Whooping Cranes", prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000, Cheyenne, Wyoming.*

1 *Western Ecosystems Technology, Inc. "Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000. Cheyenne, Wyoming.*

Table B-2
Average Yield Estimates for Rotational Grazing within a Three Pasture Rotation for Wet Meadows on Program Lands

	Pasture 1	Pasture 2	Pasture 3
Management Activity	Early and Late Season Grazing	Mid-Season Grazing	Burn and Rest

Calculation of Production Rate with Three Pasture Rotation

	Pasture 1	Pasture 2	Pasture 3
Production Rates (AUMs)/Acre	2	0.75 - 1	0
Grazing Acres	200-250	200-250	200-250
Total AUMs per Pasture (using the midpoint)	450	225	0
Estimated Expected Value of Grazing Yields on Wet Meadows for Any Pasture During Any Year	1AUM/acre		

Some wet meadow acreage will be managed using a rotational hay production scheme. It was assumed management of these areas would use a four pasture system that allows hay to be produced on two 2 pastures after July 1st each year while the other two pastures would be burned and rested in any given year. This regime is similar to the grazing management used by The Nature Conservancy for habitat areas along the Platte River. Therefore, the average yields per acre would be 1.5 tons per year as shown in Table B-3.

Table B-3
Estimated Average Yields for Hay Production for Wet Meadow within a Four Pasture Rotation on Program Lands

	Pasture 1	Pasture 2	Pasture 3	Pasture 4
Production Rates (Tons)	3.0	3.0	0	0
Number of Harvests	1	1	0	0
Probability that Acreage is in Pasture 1, 2, 3 or 4.	0.25			
Estimated average production for any pasture during any year	1.5			

Areas converted to upland grasses will also be managed using grazing and haying operations. The estimated average yield on Programs lands for upland grassland areas are summarized here. In Table C-4, the average grazing yield per acre was calculated from information provided on the rotational grazing scheme being used by Central Nebraska Public Power and Irrigation District

(Central).[2] Central is using rotational grazing scheme for 300 cow/calf pairs on 2,800 acres. According to this six-pasture rotational scheme, Central will burn one pasture each April. A second pasture will be intensively grazed for 20-25 days in June. Then from July through October, the other five pastures that were not intensively grazed will be grazed on a triple rotation of 10-15 days per pasture each rotation.

Assuming that the Program would follow a similar rotational grazing scheme, the average yields can be estimated. In the lower half of Table B-4, the AUMs per acre were calculated from the data on yields from Central's property. The total AUMs on the 2,800 acre property are 1,500 (300 X 5 months). AUMs for the one pasture that was grazed intensively in June was estimated to be 0.64/acre. This was estimated by dividing the 300 AUMs by 467 acres within one pasture (assuming six pastures of equal size). The yield on the five pastures used for rotational grazing was estimated to be 0.51. This was estimated by dividing the remaining 1,200 AUMs (1,500-300) by the estimated 2,333 acres within those five pastures. Finally, a weighted average yield per acre was estimated to be 0.54 AUMs/acre as shown in Table B-4.

The estimated yield for hay production for upland grasslands was estimated in a similar fashion to the yield on wet meadows. It was assumed that the Program would use a four pasture rotation for hay production where two pastures would be hayed each year while the other two pastures would be burned and rested. Assuming that 1.5 tons of hay can be produced per acre of upland grasses with one cutting allows the weighted average yield per acre under a rotational scheme to be estimated. The weighted average yield per acre for upland grasslands was estimated at 0.75 tons per acre as summarized in Table B-5.

Table B-4
Calculation of Production Rate with Six Pasture Rotation for Upland Grass Areas

Cow/Calf Pairs	300
Acres	2800
Number of Pastures	6
Acres per Pasture	467
Total AUMs	1500

Calculation of AUMs Per Acre During Grazing Season

	Total	June (Grazing on 1 Pasture)[a]	July – Oct. (Rotational Grazing on 5 Pastures)[b]
AUMs		0.64	0.51
Estimated Annual Weighted Average Production Rate (AUM) Per Acre	0.54		

a Calculated as 300 AUMs on 467 acres or .64 AUMs per Acre.

b Calculated as 1,200 AUMs on 2300 acres or .51 AUMs per Acre.

[2] *Western Ecosystems Technology, Inc. "Draft – Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes" prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000. Cheyenne, Wyoming.*

Table B-5
Calculation of Hay Production Rates on Upland Grasslands with a Four Pasture Rotation

	Pasture 1	Pasture 2	Pasture 3	Pasture 4
Production Rates (Tons)	1.5	1.5	0	0
Number of Harvests	1	1	0	0
Probability that Acreage is in Pasture 1, 2, 3 or 4.	0.25			
Estimated average production for any pasture during any year	0.75			

APPENDIX C

ESTIMATED RESTORATION AND MANAGEMENT COST FOR THE HABITAT PROTECTION SCENARIOS

Table C.1-1
Restoration Costs for Block A - Scenario 1[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre Per Management Area	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Woody Riparian to Bare Sand	WO/Woody	49.0	Tree Clearing	$900	Excavation or other "Dirt Work"[b]	$725	$1,625	$79,625
Herbaceous to Bare Sand	HI/Herbaceous on Island	9.3	Brush Clearing with Klearway	$200	Excavation or other "Dirt Work"[b]	$725	$925	$8,603
Shrubs to Bare Sand	SH/Shrubs on Island	102.3	Brush Clearing with Klearway	$200	Excavation or other "Dirt Work"[b]	$725	$925	$94,628
Channel/Wetland Rehabilitation	WC/Wetted Channel	9.8	Brush Clearing with Klearway	$200	High Density Seeding[d]	$300	$500	$4,900
	BB/Barren Beach	0.4	Excavation or other "Dirt Work"[b]	$725	High Density Seeding[d]	$300	$1,025	$410
	HI/Herbaceous on Island	0.4	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$216
	SI/Shrubs on Island	6.0	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$3,240
	HE/Herbaceous	9.5	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$5,130
Agriculture to Wet Meadow	MWM/Mown Wet Meadow	274.1	Land Contouring[c]	$40	High Density Seeding[d]	$300	$340	$93,194
Herbaceous to Wet Meadow	H/Herbaceous	19.5	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$10,530
Open Water Lake/Pit to Wetland Rehabilitation	OW/Open Water Lake/Pit	0.4	Land Contouring[c]	$40	High Density Seeding[d]	$300	$340	$136
Woody to Wet Meadows	WO/Woody	604.3	Tree Clearing and land contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$749,332
Wooded to Wetland Rehabilitation	WR/Wooded	14.0	Tree Clearing and land contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$17,360
Total		***1099.0***						**$1,067,303**

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.1-2
Management Costs for Block A - Scenario 1

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) * (4)	(6)	(7)	(8) = (2) * (7)
Woody to Bare Sand	WO/Woody Riparian	49	Mowing and Shredding of Woody Vegetation with Klearway	$200	$9,800	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$7,742
Shrubs to Bare Sand	SI/Shrubs on Island	102	Mowing and shredding of woody vegetation using a Klearway every 3 out of 4 years[b]	$150	$15,345	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$16,163
Herbaceous to Bare Sand	HI/Herbaceous on Island	9.3	Mowing and shredding of woody vegetation using a Klearway every 3 out of 4 years[b]	$150	$1,395	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$1,469
Channel/Wetland Rehabilitation	BB/Beach/Bar	0.4	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$3
	WC/Wetted Channel	9.8	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$78
	HE/Wet Meadow	9.5	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$76
	HI/Herbaceous on Island	0.4	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$3
	SI/Shrubs on Island	6.0	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$48
Open Water/Lake Pit to Wetland Rehabilitation	OW/Open Water	0.4	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$3
Woody to Wet Meadow	WO/Woody Riparian	604	Mowing and Shredding of Woody Vegetation with Klearway	$200	$120,860	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$7,554
Agricultural to Wet Meadow	MWM/Mown Wet Meadow	274	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$3,426
Herbaceous to Wet Meadow	H/Herbaceous	19.5	Mowing	$40	$780	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$244
Wooded to Wetland Rehabilitation	WR/Wooded	14.0	Mowing and Shredding of Woody Vegetation with Klearway	$200	$2,800	Spot Control of Noxious Weeds[d]	$8	$112
Total		***1,099***			***$150,980***			***$36,923***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year. Source: Kenny Dinan, U.S. Fish and Wildlife Service, Grand Island, Nebraska.

Table C.2-1
Restoration Costs for Block B - Scenario 1[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre Per Management Area	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Shrubs to Bare Sand	SI/Shrubs on Island	102.3	Brush Clearing with Klearway	$200	Excavation or other "Dirt Work"[b]	$725	$925	$94,628
Woody to Bare Sand	WO/Woody Riparian	48.9	Tree Clearing	$900	Excavation or other "Dirt Work"[b]	$725	$1,625	$79,463
Woody to Wet Meadow	WO/Woody Riparian	604.3	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$749,332
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	89.6	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300		
Wooded to Native Grasses	WO/Woody Riparian	102.5	Tree Clearing	$900	High Density Seeding[d]	$300		
Agricultural to Native Grasses	AL/Alfalfa	4.2	Discing	$100	High Density Seeding[d]	$300	$400	$1,680
	CO/Corn	103.9	Discing	$100	High Density Seeding[d]	$300	$400	$41,560
	OC/Other Crops	72.6	Discing	$100	High Density Seeding[d]	$300	$400	$29,040
Abandoned Sand and Gravel	GS/Sand and Gravel	13.7	No Restoration Needed			$0	$0	$0
Total		***1142.0***						***$995,702***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.2-2
Management Costs for Block B - Scenario 1[a]

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for For Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) * (4)	(6)	(7)	(8) = (2) * (7)
Shrubs to Bare Sand	SI/Shrubs on Island	102.3	Mowing and shredding of woody vegetation using a Klearway every 3 out of 4 years[b]	$150	$15,345	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$16,163
Woody to Bare Sand	WI/Woody on Island	48.9	Mowing and shredding of woody vegetation with Klearway	$200	$9,780	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$7,726
Woody to Wet Meadow	WO/Woody Riparian	604.0	Mowing and shredding of woody vegetation with Klearway	$200	$120,800	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$7,550
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	89.6	Mowing and shredding (brushog)	$65	$5,824	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,120
Wooded to Native Grasses	WO/Woody Riparian	102.5	Mowing and shredding of woody vegetation with Klearway[b]	$200	$20,500	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,281
Agricultural to Native Grasses	AL/Alfalfa	4.2	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$53
	CO/Corn	103.9	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,299
	OC/Other Crops	72.6	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$908
Abandoned Sand and Gravel	GS/Sand and Gravel	13.7	Discing to control vegetation	$100	$1,370	Discing to control vegetation	$100	$1,370
Total		***1,142***			***$173,619***			***$37,470***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes, Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year. Source: Kenny Dinan, U.S. Fish and Wildlife Service, Grand Island, Nebraska.

Table C.3-1
Restoration Costs for Segment A - Scenario 2[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre Per Management Area	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	105.9	Brush Clearing with Klearway	$200	Excavation or other "Dirt Work"[b]	$725	$925	$97,958
Woody to Bare Sand	WO/Wooded Riparian	25.5	Tree Removal	$900	Excavation or other "Dirt Work"[b]	$725	$1,625	$41,438
Herbaceous to Wet Meadow	H/Herbaceous Riparian	19.5	Brush Clearing with Klearway	$200	High Density Seeding[d]	$300	$500	$9,750
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	58.9	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$31,806
Wooded to Wet Meadow	WO/Wooded Riparian	350.9	Tree Removal and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$435,116
Agricultural to Wet Meadow	MWM/Mown Wet Meadow	171.7	Land Contouring[c]	$40	High Density Seeding[d]	$300	$340	$58,378
Total		***732.4***						***$674,445***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.3-2
Management Costs for Segment A - Scenario 2[a]

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for For Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) * (4)	(6)	(7)	(8) = (2) * (7)
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	105.9	Mowing and shredding of woody vegetation using a Klearway[b]	$150	$15,885	Mowing and shredding of woody vegetation using a Klearway[b]Spot Control of noxious weeds[d]	$158	$16,732
Woody to Bare Sand	WO/Wooded Riparian	25.5	Mowing and shredding of woody vegetation with Klearway[b]	$200	$5,100	Mowing and shredding of woody vegetation using a Klearway[b]Spot Control of noxious weeds[d]	$158	$4,029
Herbaceous to Wet Meadow	H/Herbaceous Riparian	19.5	Mowing	$40	$780	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$244
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	58.9	Mowing (brushog)	$65	$3,829	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$736
Wooded to Wet Meadow	WO/Wooded Riparian	350.9	Mowing and shredding of woody vegetation with Klearway[b]	$200	$70,180	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$4,386
Agricultural to Wet Meadow	MWM/Mown Wet Meadow	171.7	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$2,146
Total		***732.4***			***$95,774***			***$28,274***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year.

Table C.4-1

Restoration Costs for Segment B - Scenario 2[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre Per Management Area	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Woody to Native Grasses	WO/Woody Riparian	86.9	Tree Clearing	$900	High Density Seeding[d]	$300	$1,200	$104,280
Woody to Wet Meadow	WO/Woody Riparian	306.9	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$380,556
Agricultural to Wet Meadow	MWM/Mown Wet Meadow	206.5	Land Contouring[c]	$40	High Density Seeding[d]	$300	$340	$70,210
Total		***600.3***						***$555,046***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.4-2
Management Costs for Segment B - Scenario 2[a]

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for For Remaing Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) * (4)	(6)	(7)	(8) = (2) * (7)
Woody to Native Grasses	WO/Woody Riparian	86.9	Mowing and shredding of woody vegetation with Klearway	$200	$17,380	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,086
Woody to Wet Meadow	WO/Woody Riparian	306.9	Mowing and shredding of woody vegetation with Klearway	$200	$61,380	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$3,836
Agricultural to Wet Meadow	MWM/Mown Wet Meadow	206.5	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$2,581
Total		***600.3***			***$78,760***			***$7,504***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year.

Table C.5-1
Restoration Costs for Segment C - Scenario 2[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre Per Management Area	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	16.3	Brush clearing with Klearway	$200	Excavation or other "Dirt Work"[b]	$725	$925	$15,078
Woody to Bare Sand	WI/Woody on Island	12.0	Tree Clearing	$900	Excavation or other "Dirt Work"[b]	$725	$1,625	$19,500
Woody to Wet Meadow	WO/Woody Riparian	76.1	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$94,364
	WI/Woody on Island	205.1	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$254,324
Agricultural to Native Grasses	SB/Soy Beans	52.9	Discing	$100	High Density Seeding[d]	$300	$400	$21,160
	CO/Corn	105.2	Discing	$100	High Density Seeding[d]	$300	$400	$42,080
	MF/Mown Field	61.4	Discing	$100	High Density Seeding[d]	$300	$400	$24,560
	OC/Other Crops	13.5	Discing	$100	High Density Seeding[d]	$300	$400	$5,400
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	47.1	Brush clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$25,434
Total		***589.6***						***$501,900***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.5-2
Management Costs for Segment C - Scenario 2[a]

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for For Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) • (4)	(6)	(7)	(8) = (2) • (7)
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	16.3	Mowing and shredding of woody vegetation using a Klearway[b]	$150	$2,445	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$2,575
Woody to Bare Sand	WI/Woody on Island	12.0	Mowing and shredding of woody vegetation[b]	$200	$2,400	Mowing and shredding of woody vegetation using a Klearway[b] Spot Control of noxious weeds[d]	$158	$1,896
Woody to Wet Meadow	WO/Woody Riparian	76.1	Mowing and shredding of woody vegetation[b]	$200	$15,220	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$951
Woody to Wet Meadow	WI/Woody on Island	205.1	Mowing and shredding of woody vegetation[b]	$200	$41,020	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$2,564
Agricultural to Native Grasses	SB/Soy Beans	52.9	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$661
	CO/Corn	105.2	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,315
	MF/Mown Field	61.4	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$768
	OC/Other Crops	13.5	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$169
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	47.1	Mowing (brushog)	$65	$3,061	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$589
Total		***589.6***			***$64,147***			***$11,488***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes", Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year.

Table C.6-1
Restoration Cost Summary for Scenario 3[a]

Land Cover Type Affected		Acres Affected	Restoration Activity	Cost Per Acre	Additional Site Prep	Cost Per Acre	Total Restoration Cost Per Acre	Total Restoration Cost Per Management Area
(1)		(2)	(3)	(4)	(5)	(6)	(7) = (6) + (4)	(8) = (7) * (2)
Shrubs to Bare Sand	SI/Shrubs on Island	122.6	Brush Clearing with Klearway	$200	"Other" Dirt Work	$725	$925	$113,405
Shrubs to Bare Sand	Shrubs inside Floodplain	33.7	Brush Clearing with Klearway	$200	"Other" Dirt Work	$725	$925	$31,173
Shrubs to Bare Sand	WC/Wetted Channel	53.0	Brush Clearing with Klearway	$200	"Other" Dirt Work	$725	$925	$49,025
Wooded to Bare Sand	WO/Wooded inside Floodplain	14.6	Tree Clearing	$900	"Other" Dirt Work	$725	$1,625	$23,725
Wooded to Bare Sand	WI/Wooded on Island	202.0	Tree Clearing	$900	"Other" Dirt Work	$725	$1,625	$328,250
Herbaceous to Bare Sand	HI/Herbaceous on Island	11.1	Brush Clearing with Klearway	$200			$200	$2,220
Channel/Wetland Rehabilitation	BB/Beach/Bar	3.9	"Other" Dirt Work	$725	High Density Seeding[d]	$300	$1,025	$3,998
	WC/Wetted Channel	7.9	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$4,266
	WI/Wooded on Island	11.0	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$13,640
	HI/Herbaceous on Island	0.8	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$432
	SH/Shrubs inside Floodplain	0.2	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$108
	SI/Shrubs on Island	16.9	Brush Clearing with Klearway and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$9,126
Wooded to Wet Meadow	WO/Wooded inside Floodplain	1782.7	Tree Clearing and Land Contouring[c]	$940	High Density Seeding[d]	$300	$1,240	$2,210,548
Wooded to Native Grasses	WO/Wooded inside Floodplain	131.4	Tree Clearing	$900	High Density Seeding[d]	$300	$1,200	$157,680
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	201.8	Brush Clearing and Land Contouring[c]	$240	High Density Seeding[d]	$300	$540	$108,972
Agricultural to Wet Meadow	AL/Alfalfa	20.0	Land Contouring[c]	$40	High Density Seeding[d]	$300	$340	$6,800
Managed Abandoned Sand and Gravel	SG/Sand and Gravel	35.0	No restoration needed				$0	
Total		***2,649***						***$3,063,367***

a Except where noted, the restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes". Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b According to West, Inc., "Other" dirt work includes removal of silt and partial filling of dugout.

c Land contouring may be required to restore land to approximate pre-disturbance contour for hydrologic enhancement in wet meadow and wetland areas. It was assumed that land contouring would only be required on 20 percent of the acreage being restored. Therefore the expected value cost of land contouring for any particular acre would be .20 X $200 per acre. This equates to a cost per acre of $40. Source: Kenny Dinan, U.S. Fish and Wildlife, November, 1999. The cost of land contouring was obtained from West, Inc., Cheyenne, Wyoming.

d The estimated cost of high density seeding includes the seed cost, labor and the control of invasive weeds until native grasses are established (2 to 3 years). Source: Kenny Dinan, U.S. Fish and Wildlife Service, November, 1999.

Table C.6-2
Management Costs for Scenario 3[a]

Land Cover Type Affected		Area (Acres)	Necessary Management First Two Years After Restoration	Total Annual Management Cost Per Acre	Total Annual Cost Per Management Area for First Two Years After Restoration	Necessary Management During Remaining Years of Study Period	Total Annual Management Cost Per Acre for Remaining Years of Study Period	Total Annual Cost Per Management Area for For Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (2) * (4)	(6)	(7)	(8) = (2) * (7)
Shrubs to Bare Sand	SI/Shrubs on Island	122.6	Mowing woody vegatation with Kershaw Klearway[b]	$150	$18,390	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$19,371
Shrubs to Bare Sand	Shrubs inside Floodplain	33.7	Mowing woody vegatation with Kershaw Klearway[b]	$150	$5,055	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$5,325
Shrubs to Bare Sand	WC/Wetted Channel	53.0	Mowing woody vegatation with Kershaw Klearway[b]	$150	$7,950	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$8,374
Wooded to Bare Sand	WO/Wooded inside Floodplain	14.6	Mowing and Shredding of woody vegatation with Kershaw Klearway[b]	$200	$2,920	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$2,307
Wooded to Bare Sand	WI/Wooded on Island	202.0	Mowing and Shredding of woody vegatation with Kershaw Klearway[b]	$200	$40,400	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$31,916
Herbaceous to Bare Sand	HI/Herbaceous on Island	11.1	Mowing woody vegatation with Kershaw Klearway[b]	$150	$1,665	Mowing woody vegetation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$1,754
Channel/ Wetland Rehabilitation	BB/Beach/Bar	3.9	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$31
	WC/Wetted Channel	7.9	No Active Management	$0	$0	No Active Management		$0
	WI/Wooded on Island	11.0	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$88
	HI/Herbaceous on Island	0.8	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$6
	SH/Shrubs inside Floodplain	0.2	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$2
	SI/Shrubs on Island	16.9	No Active Management	$0	$0	Spot Control of Noxious Weeds[d]	$8	$135
Wooded to Wet Meadow	WO/Wooded inside Floodplain	1782.7	Mowing and Shredding of woody vegatation with Kershaw Klearway[b]	$200	$356,540	Spot Control of Noxious Weeds[d]	$8	$14,262
Wooded to Native Grasses	WO/Wooded inside Floodplain	131.4	Mowing and Shredding of woody vegatation with Kershaw Klearway[b]	$200	$26,280	Spot Control of Noxious Weeds[d]	$8	$1,051
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	201.8	Mowing (brushog)	$65	$13,117	Spot Control of Noxious Weeds[d]	$8	$1,614
Agricultural to Wet Meadow	AL/Alfalfa	20.0	No Active Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$250
Managed Abandoned Sand and Gravel	SG/Sand and Gravel	35.0	Discing to control vegetation	$100	$3,500	None		
Total		***2,614***			***$472,317***			***$86,486***

a Except where noted, restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes. Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, January, 2000.

b Mowing and shredding is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and shredding any particular acre is 0.75 X $200. This equates to $150 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year. Source: Kenny Dinan, U.S. Fish and Wildlife Service, Grand Island, Nebraska.

Table C.7-1
Estimated Restoration Costs[1]
Cottonwood Ranch

Phase	Completion Date	Restoration Activity	Restoration Cost Range (1998 $)	Median
1	2001	Removal of 80-90 acres of Woody vegetation; develop approximately 1.2 miles of sloughs and backwater areas; seed 30 acres to native grasses; Remaining area will be managed as least tern and piping plover nesting habitat; active channel or allowed to revegetate naturally.	$149,000 - $157,000	$153,000
2	2002	Excavation of 2.5 to 3 miles of swales in row crop areas; removal of silt and sediment from existing wetlands; 150 to 200 acres of existing cropland or grasslands will be seeded with native plant species.	$214,000 - $241,000	$227,500
3	2003	Removal of 95 to 155 acres of woody vegetation; development and enhancement of 1.5 to 1.75 miles of sloughs and backwater areas; and enhancement of 30 acres of native grassland areas.	$137,000 - $162,000	$149,500
4	2004	Removal of 110 to 120 acres of wood vegetation; 80 to 90 acres will be seeded to native grasslands; and approximately 3 to 4 miles of sloughs and backwater areas will be developed and enhanced.	$210,000 - $236,000	$223,000
5	2005	Removal of 130 to 160 acres of woody vegetation; Channel widening enhancements; and approximately 110 acres of will be seeded with native grassland species.	$375,000 - $433,000	$404,000
6	2006	Removal of 150 to 160 acres of woody vegetation; approximately 1.5 backwater and slough areas will be enhanced; and approximately 100 to 120 acres will be seeded to native grassland species.	$182,000 - $196,000	$189,000

1 *Restoration costs for Cottonwood Ranch were obtained from: Nebraska Public Power District, "Development and Enhancement Plan for Nebraska Public Power District's Cottonwood Ranch Property", July 21, 1999, Kearney, Nebraska.*

Table C.7-2
Summary of Management Costs at Cottonwood Ranch[a]

Land Cover Type Affected		Acres Affected	Necessary Management First Two Years After Restoration	Annual Cost Per Acrea	Total Annual Management Cost Per Area for First Two Years	Necessary Annual Management during Remaining Years of Study Period	Annual Cost Per Acre	Total Annual Management Cost Per Area for Remaining Years of Study Period
(1)		(2)	(3)	(4)	(5) = (4) * (2)	(6)	(7)	(8) = (2) * (7)
Woody Riparian to Sloughs, Backwater Areas and Wetlands	WO/Woody	98.0	Mowing and Shredding of Woody Vegetation using a Klearway	$200	$19,600	Spot Control of Noxious Weeds	$8	$784
Woody to Bare Sand	WI/ Woody on Island	7.1	Mowing and Shredding of Woody Vegetation using a Klearway	$200	$1,420	Mowing woody vegatation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$1,122
Woody to Native Grasses	WI/ Woody on Island	3.8	Mowing and Shredding of Woody Vegetation using a Klearway	$200	$760	Grazing annually; Burning every 4 years; spot control of noxious weeds	$13	$48
Beach Bar to Bare Sand	BB/Beach Bar	45.2	Mowing and discing of vegetation every 3 out of 4 years	$150	$6,780	Mowing woody vegatation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$7,142
Shrubs to Bare Sand	SI/Shrubs on Island	16.5	Mowing and discing of vegetation every 3 out of 4 years	$150	$2,475	Mowing woody vegatation with Kershaw Klearway[b];Spot control of noxious weeds[d]	$158	$2,607
Shrubs to Wetland Rehabilitation	SI/Shrubs on Island	0.3	Mowing and shredding (brushog)	$65	$20	Spot Control of Noxious Weeds	$8	$2
Shrubs to Native Grasses	SH/Shrubs inside Floodplain	18.9	Mowing and shredding (brushog)	$65	$1,229	Grazing annually; Burning every 4 years; spot control of noxious weeds	$13	$236
Herbaceous to Wet Meadows	HE/Herbaceous	67.4	Mowing	$0	$0	Grazing annually; Burning every 4 years; spot control of noxious weeds	$13	$843
Herbaceous to Wetland Rehabilitation	HE/Herbaceous	91.0	No Management	$0	$0	Spot Control of Noxious Weeds	$8	$728
Herbaceous to Sloughs or backwater areas	HI/Herbaceous on Island	20.8	No Management	$0	$0	Spot Control of Noxious Weeds	$8	$166
Herbaceous to Native Grasses	HI/Herbaceous on Island	18.7	Mowing	$40	$748	Grazing annually; Burning every 4 years; spot control of noxious weeds	$13	$234
Emergents to Wetland Rehabilitation	EM/Emergents	1.5	No Management	$0	$0	Spot Control of Noxious Weeds	$8	$12
Woody to Native Grasses	WO/Woody	152.5	Mowing and Shredding of Woody Vegetation using a Klearway	$200	$30,500	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,906
Woody to Wet Meadows	WO/Woody	151.6	Mowing and Shredding of Woody Vegetation using a Klearway	$200	$30,320	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,895
Active Channel Areas	CH/Channel	27.9	No Management	$0	$0	No Necessary Annual Management during Remaining Years of Study Period	$0	$0
Agricultural to Wet Meadow or Native Grasslands	CO/Corn	233.4	No Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$2,918
	OC/Other Crops	124.8	No Management	$0	$0	Grazing or Haying Annually; Burning every 4 years[c]; Spot Control of Noxious Weeds[d]	$13	$1,560
Development	Gravel Road	3.0	No Management	$0	$0	No Management		
	Single Dwelling	2.2	No Management	$0	$0	No Management		
Total		***1,177***			***$93,851***			***$23,362***

a Restoration cost information (cost per acre) was taken from Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes". Prepared for the Habitat Criteria Subcommittee, Land Committee and the Governance Committee, September, 1999.

b Mowing and discing is assumed to occur on any one acre every 3 out of 4 years. Therefore, the expected cost of mowing and discing any particular acre is 0.75 X $150. This equates to $113 per acre per year.

c Burning of grasslands and wet meadows is assumed to occur once every 4 years. Therefore, the expected cost of burning any particular acre is 0.25 X $18 per acre. This equates to $4.50 per acre per year.

d Spot control of noxious weeds is assumed to occur on 20% of the acreage annually. Therefore, the expected cost of providing weed control to any particular acre is 0.20 X $40 per acre. This equates to $8 per acre per year.